物質安全資料表
依 GHS
MAKROLON OD 2015
版本號 2.6　　修訂日期 16.07.2013　　印出日期 28.01.2014

一、物品與廠商資料

產品鑒別

物品中英文名稱　：　MAKROLON OD 2015

物質或混合物的建議用途與使用限制

建議用途及使用限制　：　模鑄塑膠物品的生產

物質安全資料表供應商的詳細資料:
Bayer MaterialScience AG
BMS-IO-S&T-PSRA-PSI Product Safety
51368 Leverkusen, Germany

Tel: +49 214 30 25026
Fax: +49 214 30 9650035
e-mail: productsafety@bayerbms.com
緊急聯絡電話號碼: 0800-008-119 或 0800-055-119(僅限化學品洩漏、火災或人員中毒)
緊急傳真 : (03)591-0030 或 (03)591-0032
台灣拜耳材料科技股份有限公司
83245高雄市林園區北汕里石化三路1號
電話:(02) 8101-1000　傳真:(02) 8101-0028

二、危害辨識資料

物質或混合物的分類

物品危害分類:

依據GHS分類不屬於危害物質。

危害圖式
依據GHS分類不屬於危害物質。

三、成分辨識資料

產品類型: 混合物

雙酚A聚合之聚碳酸酯

四、急救措施

急救措施說明

若接觸皮膚: 接觸到熱的熔化物： 立即用大量水冷卻。 切勿強行拔除熱熔物在皮膚上形成的硬皮或塗抹溶劑於受傷的皮膚上。 應立即送醫，處理可能的灼傷及做適當的皮膚照顧。

以下資訊與室溫下運作本產品有關。 若接觸皮膚，以肥皂及大量清水徹底清洗受影響部位。

五、滅火措施

適用滅火劑: 噴灑水柱。, 滅火乾粉, 二氧化碳(CO2), 泡沫, 化學乾粉

物質或混合物的特殊危害:

燃燒會釋放出一氧化碳,二氧化碳,氮的多種氧化物和微量的氰化氫. 在著火或爆炸情況下,請勿吸進濃煙。

消防人員注意事項::

消防員應穿著自攜式呼吸器具。

勿讓受污染的消防水流進土壤、地下水、或地表水。

六、洩漏處理方法

個人預防、保護裝備與緊急程序: 小心滑倒！

污染與清理方法與材料: 用機械設備搬運。 防止粉塵的生成。

其他章節參照: 進一步廢棄措施參見章節13。

七、安全處置與儲存方法

安全操作的預防措施:

在建議的製程情況下可能會釋出少量殘存的單體及殘留的溶劑。 提供良好的通風及/或使用局部抽排氣系統，以使不致超過第 8 章節所規範工作場所之恕限值。

粉塵應使用有效率的抽排氣設備予以移除。

勿飲食及抽煙。 休息前或工作結束後須洗手並使用皮膚防護軟膏。 更換受污染衣物。

安全儲存的條件(包括任何不相容性):

對儲存條件無特殊要求。

八、暴露控制及個人防護措施

當運作本產品，特別是在高溫下運作時，應遵守與下列物質相關之法規。 依據我們的經驗，於蒸氣可能生成處，提供有效的新鮮空氣與抽排氣設備，將能確保符合下列的容許限值。

控制參數

純物質	化學文摘社登記號碼 (CAS-No.)	基準	類型	值	最高容許濃度 (CEILING)	備註
酚 phenol	108-95-2	TW OEL	八小時日時量平均容許濃度 (TW	5 ppm 19 mg/m3		
酚 phenol	108-95-2	TW OEL				可能經皮膚吸收。
氯苯 chlorobenzene	108-90-7	TW OEL	八小時日時量平均容許濃度 (TW	75 ppm 345 mg/m3		

暴露控制

呼吸防護:
當有粉塵生成時，依據EN 143使用含有P1微粒過濾呼吸器。

手部防護:
合適的安全手套材料；EN 374:
聚氯乙烯 - PVC(>= 0.5毫米)
若手套被污染和/或損壞了則必須更換。

眼睛防護:
配戴眼睛防護具/防護面罩。

皮膚及身體防護:
穿合適的防護服。

九、物理及化學性質

基本物理與化學屬性相關資訊

物質狀態:	顆粒
顏色:	依據染色而不同
氣味:	無臭味
pH值:	不適用
軟化點:	> 130 - 160 °C
較高/較低易燃性或爆炸界限:	不適用
蒸氣壓:	不適用
密度:	大約 1.2 - 1.4 g/cm³
容積密度:	600 - 700 kg/m3
水溶性:	實際上不溶
自燃溫度:	不適用
燃點:	> 450 °C
分解溫度：:	>= 380 °C
動態黏度:	不適用

十、安定性及反應性

化學穩定性: 不適當製程或燃燒所導致的過度加熱，可能釋出對健康有害的燻煙。

危險反應的可能性: 未發現有危害性反應

危害性分解物: 因悶燒或不完全燃燒，可能會生成主要由一氧化碳和二氧化碳所組成的毒性燻煙。

十一、毒性資料

依據我們的經驗與資訊，若適當地運作，本產品不會對健康有危害。

十二、生態資料

勿讓溢出之本品進入水道，廢水或土壤。

更多關於生態毒性的資訊:
本產品幾乎不溶於水 。 因其堅硬度及不溶於水的特性，若適當地運作本產品，則預期並不會有生態問題。 本產品不易被生物分解。

十三、廢棄處置方法

應依國際、國家及當地適用的法律、法令與法規廢棄。

在歐盟國家廢棄處置，應依據歐洲廢棄物分類(EWC)編碼採用合適之分類編碼.

廢料處理方法
容器儘可能地清空後(如傾倒、切削或排空直到"滴乾")，將其送至化學業現行回收系統所設置的合適回收點回收。 容器應依照國家法令及環境相關法規回收。

本產品可採機械式回收。在經過適當處理後，本產品可以再熔化， 並再重新製作爲新的模塑製品。但僅在材質已被選擇性分類回收 並依據其種類仔細區隔情況下，才可採機械式回收再利用。

十四、運送資料

臺灣	非危險貨物
IATA	非危險貨物
IMDG	非危險貨物
使用者特殊預防措施	： 非危險 貨物. 保持乾燥。

十五、法規資料

專門針對物質與或混合物爲主的安全、健康與環境規定/立法

適用法規:
勞工安全衛生法
危險物與有害物標示及通識規則
道路交通安全規則
廢棄物清理法

十六、其他資料

此物質安全資料表也適用於對應的MAS... 類型。

製表單位 : 台灣拜耳材料科技股份有限公司

地址 : 11049台北市信義路五段7號54樓

電話 : (02)8101-1000

製表人:

職稱 : 品質暨環保部經理

姓名(簽章): 黃元隆

其他相關訊息

此安全技術說明書提供的信息在其發布之日是準確無誤的,所給出的信息僅作爲安全搬運,儲存,運輸,處理等的指導,而不能被作爲擔保和質量指標。此信息僅適用於指定的物質而不能用於其它相關的物質,除非特別指明。

Material Safety Data Sheet

Date of making : 25 Jan. 2013

1.Substance identity and company contact information

Product name:	Conductive ZnS-SiO2 Target
Company:	MMC ELECTRONIC MATERIALS TAIWAN CO., LTD.
Address:	NO.20-1,JIANGUO RD., TANZIH DISTRICT, TAICHUNG CITY 42760, TAIWAN (R.O.C)
Telephone Number:	886-4-25320173
Emergency Telephone Number:	886-4-25320173
FAX Number:	886-4-25324777
Recommended use and restraint:	Sputtering Target

2.Hazards identification

GHS classification

Physical and chemical hazards	Sort of Gunpowder	Out of classification
	Combustibility, Ignition gas	Out of classification
	Combustibility, Ignition aerosol	Out of classification
	Oxidizing gas	Out of classification
	High pressure gas	Out of classification
	Ignition liquid	Out of classification
	Combustibility solid	Out of division
	Self reaction chemical	Out of classification
	Spontaneous combustion liquid	Out of classification
	Spontaneous combustion solid	Out of division
	Self heating chemical	Out of division
	Water reaction combustibility chemical	Out of division
	Oxidizing liquid	Out of classification
	Oxidizing solid	Impossible to classify
	Organic dioxide	Out of classification
	Metal corrosive substance	Impossible to classify
Adverse human health effects	Acute toxicity(Oral)	Out of division
	Acute toxicity(Dermal)	Out of division
	Acute toxicity(Inhalation:Gas)	Out of classification
	Acute toxicity(Inhalation:Steam)	Out of classification
	Acute toxicity(Inhalation:Dust)	Impossible to classify
	Acute toxicity(Inhalation:Mist)	Out of classification
	Skin corrosive, Irritation	Impossible to classify
	Heavy injuries to eyes, Irritation	Impossible to classify
	Sensitization of respiratory organs	Impossible to classify
	Sensitization of skin	Impossible to classify
	Variation of germ cell	Out of division
	Carcinogenicity	Division1A
	Genital toxicity	Impossible to classify
	Specific target organs, General toxicity (Single exposure)	Division1 (Respiratory organs)
	Specific target organs, General toxicity (Repetition exposure)	Division1 (Respiratory organs, kidneys)
	Hazardous of Inhalational respiratory organs	Impossible to classify
Environmental effects	Acute hazardous top the aquatic Environmental	Out of division
	Chronic hazardous top the aquatic Environmental	Out of division

Label element

Symbol:

Alert Words: Danger

Hazards information:	Inhalation: hazardous. Likely to get cancer. Impediment of the respiratory organs. Impediment of the respiratory organs and kidneys by long- term or repetition exposure.
Caution:	【Safety Measure】 Get the instruction manual before use. Not to handle until understand all safety directions. Wear appropriate protections (gloves, eyeglasses, dustproof mask). Use well ventilated area only and set up partial ventilation system according to the circumstances. Wash hands and face carefully and gargle after use. Avoid exposure by using personal protective equipment and ventilation system. Not to inhale dust and fumes. Not to do eating, drinking and smoking while using. 【First aid】 If having indisposition, arrange for transport to nearest medical facility for examination and treatment by a physician. In case of an exposure or risk of it, arrange for transport to nearest medical facility for examination and treatment by a physician. 【Storage】 Store in warehouse with roof and not to contact water, humidity or acid gas. Store in locked place. 【Disposal】 Obey the relevant law as to the disposal of wastes.

3.Chemical composition and data on components

Chemical substance

	[ZnS]	[SiO2]
Chemical composition:	ZnS	SiO_2
Other name:	No information	No information
Element:	ZnS (Zinc Sulfide)	Crystalline silica, quartz
Chemical distinction (Chemical formula or structure formula):	No information	No information
CAS No:	1314-98-3	14808-60-7
Reference Number in Gazetted List in Japan:	PRTR: 1-572	(1)-548
Contamination and stable additive contribute classification:	No data	No information
Concentration or concentration range:	No information	No information

4.First-aid measures

Inhalation:	Move sufferers to place filled with fresh air, and let repose with posture easy to breath.
	Blow nose and gargle.
	Arrange for transport to nearest medical facility for examination and treatment by a physician.
Skin contact:	Flushing with water and soap immediately.
	Arrange for transport to nearest medical facility for examination and treatment by a physician immediately.
Eye contact:	Gentry rinse the affected eyes with clean water. In case of wearing contact lens, better to remove them.
	If irritation persists, arrange for transport to nearest medical facility for examination and treatment by a physician.
	Arrange for transport to nearest medical facility for examination and treatment by a physician immediately.
Ingestion:	Arrange for transport to nearest medical facility for examination and treatment by a physician immediately.
	If ingest in quantity, drink water or saline solution and spit out.
	Rinse mouth with water.
Expected acute symptom or in behind:	If ingest in quantity, likely to cause vomit, diarrhea, stomachache, fever and joint pain.
	Likely to irritate skin, eyes, bronchus and nose and cause inflammation.
	Inhalation: cough.
Most important indications or symptom:	No data
Protection for rescuer:	No data

5.Fire-fighting measures

Extinguish media:	Incombustible itself. Fire of the periphery: Use extinguish media according to the fire circumstances.
Forbidden extinguish media:	No information
Special hazards:	Occurrence of dust.
	Likely to slide if powder remaining on the floor by water used for extinction.
	Containers are likely to explode by heating.
Special extinguish way:	Move containers from fire area if not in danger.
	In case of impossible to move, sprinkle containers and the periphery to cool.
Protection for fire-fighters:	Fire-fighters should wear proper protective(heat-resistant) and self-contained breathing apparatus with full facepiece operated in positive pressure mode.
	Wear protective eyeglasses and respirators to avoid inhaling dust.

6.Accidental release measures

Caution for the human body, protective and emergency measure:	Ventilate sufficiently until complete disposal. (Indoors)
	Keep out without authorized personnel.
	Use proper personal protective equipment as indicated in Section8 to avoid contacting eyes and skin or inhalation of gas or fumes.
	Stay windward.
	Leave lowland areas.
	Isolate all direction with appropriate distance as leakage area immediately.
Caution for the environment:	Caution not to affect the environment by discharging rivers.
	Avoid emitting to the environment.
Retrieve, Neutralization:	Sweep leakages and retrieve empty containers. Afterward dispose it.
	Prevent dispersion by moistening with water. After that, flush with a mass of water. (Caution: Avoid emitting to the environment.)
Containment and cleaning way :	Stop leaking if not in danger.
	Prevent from discharging rivers by piling up with sandbags.
Prevention of secondary disaster:	Dispose frequently. Likely to slide if remaining on the floor .
	Remove All ignition source immediately. (Smoking nearby, spark and flame is prohibited.)

7.Handling and storage

Handling:

Technical measure:	Do appropriate engineering controls and use proper personal protective equipment as indicated in Section8.
Ventilation:	Do appropriate ventilation as indicated in Section8.
Caution for safety handling:	Get the instruction manual before use.
	Not to handle until understand all safety directions.
	Make the work place well ventilated and use partial ventilation systems where dust occurs. (Indoors)
	Wash hands carefully after use.
	Not to contact, inhale and swallow.
	Use adequate ventilation(exhaust) to keep airborne concentrations under the limit of exposure.
	Not to do eating, drinking and smoking while using.
Avoidance of contact:	Refer to Section10.

Storage:

Technical measure:	Set up facilities equipped with adequate lighting and ventilation to store and handle dangerous objects in storage place.
Hazardous Polymerization:	Refer to Section10.
Conditions to storage:	Not to contact acid gas.
	Store in warehouses with a roof.
	Avoid high temperature and high humidity.
	Store in locked place.
Materials of containers or package:	Glass, polyethylene, polypropylene etc.
	Keep in closed and undamageable package, but no regulation of package or containers.

8.Exposure control and personal protection

Control concentration:	Not set.
Allowance concentration(Exposure limit, Biological exposure indicator) :	
ACGIH	ZnS: Not set.
ACGIH (2006ver.)	TLV-TWA SiO2: 0.025mg/m^3 A2
Engineering Controls:	Make the work place well ventilated and set up partial ventilation systems where dust occurs.
	Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations under the limit of exposure.
	In case of occurring dust or fume in high temperature process, set up ventilation device to keep air pollutive substances under control concentration.

Personal Protective Equipment:

Respiratory organs:	Use appropriate respirators (dustproof mask).
Hands:	Wear appropriate protective gloves.
Eyes:	Wear appropriate protective eyeglasses(standard glasses with side board type, goggles type, side shield type)
Skin and Body:	Wear appropriate protective clothing and face protections.
Sanitary measure:	Wash hands carefully after use.

9.Physical and chemical properties

	[ZnS]	[SiO2]
Appearance, physical state,form,color:	White to yellow, powder	Colorless, white or black, purple, green discoloration crystal
Odor:	Odorless	No data
pH:	No data	No data
Melting point, Coagulating point:	1180℃ (sublimation)	1610℃(Melting point)
Boiling point, Initial boiling point and Boiling range:	Sublimation	2230℃(Boiling point)
Flash point:	Incombustible	Incombustible
Explosion range:	No data	No data
Steam pressure:	No data	10mmHg (1732℃) [conversion value 1333Pa(1732℃)]
Steam density(Air=1):	No data	No data
Specific Gravity:	4.1g/ml	2.5
Solubility:	0.065mg/100 H2O(at 18℃)	Insoluble
Octanol/Water Partition Coefficient:	No data	No data
Spontaneous combustion temperature:	No data	Incombustible
Decomposition temperature:	Sublimation	No data
Threshold of odor:	No information	No data
Evaporation speed (Butyl acetate= 1):	No data	No data
Combustion property (Solid, Gas):	No data	No data
Viscosity:	No data	No data

10.Stability and reactivity

[ZnS]

Chemical Stability:	Considered as stable under storage and handling conditions at law. Sublime by heating. Oxide gradually in the air and generate zinc sulfate. (In case of containing water)
Incompatibilities with Other Materials:	No data
Conditions to Avoid:	Sunlight, heat.
Hazardous Polymerization:	Strong acid.
Hazardous Decomposition Products:	Sulfur oxide, hydrogen sulfate.

[SiO2]

Chemical Stability:	Stable under the normal handling conditions. (room temperature)
Incompatibilities with Other Materials:	React with strong oxidizing agents and likely to cause fire and explosion. React with hydrogen fluoride
Conditions to Avoid:	Diffusion of dust.
Hazardous Polymerization:	Strong oxidizing agents, hydrogen fluoride
Hazardous Decomposition Products:	Nothing

11.Toxicological information

[ZnS]

Acute toxicity:	Oral:	Out of division
	Dermal:	Out of division
	Inhalation (steam) :	Impossible to classify
	Inhalation (dust, mist) :	Impossible to classify
		Likely to irritate nose, throat and tracheas.
Skin corrosive, Irritation:	No data	
Heavy injuries to eyes・Irritation:	No data	
Sensitization of respiratory organs or skin:	No data	
Variation of germ cell:	No data	
Carcinogenicity:	No data	
Genital toxicity:	No data	
Specific target organs, General toxicity:	No data	
(Single exposure):		
Specific target organs, General toxicity:	No data	
(Repetition exposure):		
Hazardous of Inhalational respiratory organs:	No data	

[SiO2]

Acute toxicity:	Oral	Impossible to classify because of insufficient data.
	Dermal	No data
	Inhalation	No data
Skin corrosive, Irritation:	No data	
Heavy injuries to eyes・Irritation:	Impossible to classify	
Sensitization of respiratory organs or skin:	Sensitization of respiratory organs: No data	
	Sensitization of skin: No data	
Variation of germ cell:	Out of division	
Carcinogenicity:	Division1A	
	Likely to get cancer.	
	IARC Group1 (Carcinogenic for human body.)	
Genital toxicity:	No data	
Specific target organs, General toxicity:	Division1 (Respiratory organs)	
(Single exposure):	Impediment of the respiratory organs.	
Specific target organs, General toxicity:	Division1 (Respiratory organs, kidneys)	
(Repetition exposure):		
Hazardous of Inhalational respiratory organs:	No data	

12.Ecological information

Acute hazardous top the aquatic Environmental:	Out of division
Chronic hazardous top the aquatic Environmental:	Out of division

13.Disposal considerations

The rest of waste:	Obey the relevant law as to the disposal of wastes. Dispose by manufacturers in case of returning backing plate etc. to reuse.

14.Transport information

IMAG(P.4157)Class	None Known.
ICAO/IATA:Class	None Known.
UN/NA	None Known.

15.Regulations

US federal regulations	No information
TSCA is not required.	
International regulations	No information
Canadian Domestic	No information
Substance list:	None known.

Information about limitation of use: For use only by technically qualified individuals.

16.Other information	The information is revised by the new knowledge. Although the information herein is based on the best of our knowledge, we cannot guarantee the accuracy or completeness of the information contained.

Material Safety Data Sheet

Date of making : 08 Sep. 2011

1.Substance identity and company contact information

Product name:	TeGeSb Target
Company:	MITSUBISHI MATERIALS CORPORATION
Address:	KFC Bldg.8F,1-6-1,YOKOAMI,SUMIDA-KU,TOKYO 130-0015
Telephone Number:	81-3-5819-7320
Emergency Telephone Number:	81-79-568-2300(MITSUBISHI MATERIALS Co. Sanda Plant)
FAX Number:	81-3-5819-7321
Recommended use and restraint:	Sputtering Target

2.Hazards identification

GHS classification

Physical and chemical hazards	Sort of Gunpowder	Out of classification
	Combustibility, Ignition gas	Out of classification
	Combustibility, Ignition aerosol	Out of classification
	Oxidizing gas	Out of classification
	High pressure gas	Out of classification
	Ignition liquid	Out of classification
	Combustibility solid	Impossible to classify
	Self reaction chemical	Out of classification
	Spontaneous combustion liquid	Out of classification
	Spontaneous combustion solid	Out of division
	Self heating chemical	Out of classification
	Water reaction combustibility chemical	Out of division
	Oxidizing liquid	Out of classification
	Oxidizing solid	Out of classification
	Organic dioxide	Out of classification
	Metal corrosive substance	Impossible to classify
Adverse human health effects	Acute toxicity(Oral)	Division3
	Acute toxicity(Dermal)	Impossible to classify
	Acute toxicity(Inhalation:Gas)	Out of classification
	Acute toxicity(Inhalation:Steam)	Impossible to classify
	Acute toxicity(Inhalation:Dust)	Impossible to classify
	Acute toxicity(Inhalation:Mist)	Out of classification
	Skin corrosive, Irritation	Division2
	Heavy injuries to eyes, Irritation	Division2A-2B
	Sensitization of respiratory organs	Impossible to classify
	Sensitization of skin	Impossible to classify
	Variation of germ cell	Impossible to classify
	Carcinogenicity	Impossible to classify
	Genital toxicity	Division2
	Specific target organs, General toxicity (Single exposure)	Division2(peripheral nerves), Division3 (irritation of the respiratory tract)
	Specific target organs, General toxicity (Repetition exposure)	Division2 (respiratory organs)
	Hazardous of Inhalational respiratory	Impossible to classify
Environmental effects	Acute hazardous top the aquatic Environmental	Impossible to classify
	Chronic hazardous top the aquatic Environmental	Impossible to classify

Label element

Symbol:

Alert Words: Danger

Hazards information:	Hazardous, in case of ingestion.(Oral) Skin irritation Strong eye irritation Likely to have a bad influence on genital faculty or fetus. Likely to cause impediment of peripheral nerves or irritation to the respiratory organs. Minute powder can be ignitable or likely to cause dust explosion. Dermal absorption is hazardous. Irritate mucous membrane of eyes. Irritate lungs and the upper respiratory tract. Likely to affect kidneys, liver or blood. Likely to cause impediment of respiratory organs by long- term or repetition exposure.
Caution:	【Safety Measure】 Not to handle until understand all safety directions. Not to do eating, drinking and smoking while using. Avoid exposure by using personal protective equipment and ventilation system. Wear protective gloves, eyeglasses and face protections. Not to inhale dust and fumes. Wash hands carefully after use. Use outside or a area with good ventilation only. Use protections for respirators. 【First aid】 Eye contact: Gentry rinse the affected eyes with clean water. In case of wearing contact lens, better to remove them. If eye irritation persists, arrange for transport to nearest medical facility for examination and treatment by a physician. Skin contact: Flushing with water and soap. If feel skin irritation, arrange for transport to nearest medical facility for examination and treatment by a physician. Take off the dirty work clothes. Wash the dirty work clothes in case of reuse. In case of an exposure or risk of it, contact a physician. Ingestion: Arrange for transport to nearest medical facility for examination and treatment by a physician immediately. Rinse mouth with water. In case of inhaling, move sufferers to place filled with fresh air, and let repose with posture easy to breath. And contact a physician immediately. If having indisposition, arrange for transport to nearest medical facility for examination and treatment by a physician. 【Storage】 Store in locked place. Intercept from the sunlight and store in location with good ventilation. 【Disposal】 Obey the relevant law as to the disposal of wastes.

3.Chemical composition and data on components

Chemical substance

	[Te]	[Ge]
Chemical composition:	Te	Ge
Other name:	No information	No information
Element:	Te (Tellurium)	Ge (Germanium)
Chemical distinction (Chemical formula or structure formula):	No information	No information
CAS No:	13494-80-9	7440-56-4
Reference Number in Gazetted List in Japan:	Not applicable	Not applicable
Contamination and stable additive contribute classification:	No information	No information
Concentration or concentration range:	No information	No information

[Sb]

Chemical composition:	Sb
Other name:	No information
Element:	Sb (Antimony)
Chemical distinction (Chemical formula or structure formula):	No information
CAS No:	7440-36-0
Reference Number in Gazetted List in Japan:	Not applicable
Contamination and stable additive contribute classification:	No information
Concentration or concentration range:	No information

4.First-aid measures

Inhalation:	Move sufferers to place filled with fresh air, and let repose with posture easy to breath.
	Contact a physician immediately.
	If having indisposition, arrange for transport to nearest medical facility for examination and treatment by a physician.
Skin contact:	Take off the dirty work clothes.
	Flushing with water and soap immediately.
	If feel skin irritation, arrange for transport to nearest medical facility for examination and treatment by a physician.
	Arrange for transport to nearest medical facility for examination and treatment by a
	Wash the dirty work clothes in case of reuse.
Eye contact:	Gentry rinse the affected eyes with clean water. In case of wearing contact lens, better to remove them.
	If irritation persists, arrange for transport to nearest medical facility for examination and treatment by a physician.
	Arrange for transport to nearest medical facility for examination and treatment by a physician.
Ingestion:	Contact a physician immediately.
	Rinse mouth with water.
	Arrange for transport to nearest medical facility for examination and treatment by a physician.
	Make sure of remaining conscious and make spit out.
Expected acute symptom or in behind:	Inhalation: Lethargy, dryness of mouth, metallic taste, headache, smell of garlic, nausea, cough, vomit.
	Eye contact: Redness, pain, drug wound.
	Skin contact: Redness, pain, drug wound, dryness of skin.
	Oral ingestion: Stomachache, constipation, vomit, sultriness, diarrhea and death. And refer to section "Inhalation"
Most important indications or symptom:	No information
Special caution for physician:	Medical progress observation is essential.

5.Fire-fighting measures

Extinguish media:	Dry sand, graphite powder, G-1(R) or Met-L-X powder (extinguish media :sodium chloride base), dry chemicals.
Forbidden extinguish media:	Water, foamy extinguish media, CO2
Special hazards:	Likely to occur irritate, toxic or corrosive gas and fumes by fire.
	If use water in case of metal fire, likely to occur hydrogen gas.
Special extinguish way:	Move containers from fire area if not in danger.
	Desirable sealing way and choking extinguish in case of metal fire.
	If impossible to put out a fire, keep combusting until it burns out with securing the periphery.
Protection for fire-fighters:	Fire-fighters should wear proper protective(heat-resistant) and self-contained breathing apparatus with full facepiece operated in positive pressure mode.

6.Accidental release measures

Caution for the human body, protective and emergency measure:	Keep out without authorized personnel.
	Isolate all direction with appropriate distance as leakage area immediately.
	Use proper personal protective equipment as indicated in Section8 to avoid contacting eyes and skin or inhalation of gas or fume.
	Not to contact leakages and broken containers without appropriate protective work clothes. Not walk in them.
	Stay windward.
	Leave lowland areas.
Caution for the environment:	Caution not to affect the environment by discharging rivers.
	Avoid emitting to the environment.
Retrieve, Neutralization:	Sweep leakages and retrieve empty containers.
Containment and cleaning way :	Stop leaking if not in danger.
Prevention of secondary disaster:	Dispose frequently. Likely to slide if remaining on the floor .
	Remove All ignition source immediately. (Smoking nearby, spark and flame is prohibited.)
	Prevent from flowing into ditches,sinks,basements or closed place.

7.Handling and storage

Handling:

Technical measure:	Do appropriate engineering controls and use proper personal protective equipment as indicated in Section8.
Ventilation:	Do appropriate ventilation as indicated in Section8.
Caution for safety handling:	Not to handle until understand all safety directions.
	Not to contact, inhale and swallow.
	Not to get in eyes.
	Not to inhale dust and fumes.
	Not to do eating, drinking and smoking while using.
	Wash hands carefully after use.
	Use outside or well ventilated area only.
	Do electrostatic measure. Wear conductive work clothes and put on conductive safety shoes .
	Use adequate ventilation(exhaust) to keep airborne concentrations under the limit of exposure.
Avoidance of contact:	Refer to Section10.

Storage:

Technical measure:	Storage place should be fire-resistant structure(wall, pillars, floor) and beams should be made of incombustible materials.
	The roof of storage place should be made of incombustible materials and roofed over with metal plate or other light incombustible materials besides not to set up the ceiling.
	Make the floor of storage place water impenetrable structure.
	Set up facilities equipped with adequate lighting and ventilation to store and handle dangerous objects in storage place.
Hazardous Polymerization:	Refer to Section10.
Conditions to storage:	Store separate from oxidizing agents.
	Store in locked place.
	Keep in closed package and store in cool location with good ventilation.
	Store separate from ignition source like heat,spark,bare fire. No smoking.
	Store separate from hazardous polymerization.
Materials of containers or package:	Use containers provided UN transportation laws and regulations.

8.Exposure control and personal protection

Control concentration: Not set.

Allowance concentration(Exposure limit, Biological exposure indicator) :

ACGIH	(2005ver.)	TLV-TWA	Te: 0.1mg/m^3
	(2006ver.)	TLV-TWA	Ge: 10mg/m^3(Aspirating dust), 3mg/m^3(Inhaling dust)
	(2005ver.)	TLV-TWA	Sb: 0.5mg/m^3

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations under the limit of exposure.

Set up partial ventilation prevented from explosion.

Not handle without using sealed devices, machinery, or partial ventilation.

Take measures (seal the process, partial ventilation etc.) to keep airborne concentrations under the recommended control concentration.

In case of occurring dust or fume in high temperature process, set up ventilation device to keep air pollutive substances under control concentration.

Personal Protective Equipment:

Respiratory organs:

Use appropriate protections for respirators.

If there's a possibility of exposure, use air sending mask, air respirator or oxygen respirators.

Use appropriate positive pressure air respirators whenever use this substance.

Hands:

Wear appropriate protective gloves.

Wear thermal gloves.

Eyes:

Wear appropriate protective eyeglasses(standard glasses type, standard glasses with side board type, goggles type)

Skin and Body:

Wear appropriate protective clothing and face protections.

Sanitary measure:

Not to do eating, drinking and smoking while using.

Wash hands carefully after use.

9.Physical and chemical properties

	[Te]	[Ge]
Appearance, physical state,form,color:	Uncrystallized powder having metallic character colored dark gray to brown or silvery white and shiny crystallized solid.	Grayish white.
Odor:	Odorless	No data
pH:	No data	No data
Melting point, Coagulating point:	449.5°C	937°C(Melting point)
Boiling point, Initial boiling point and Boiling range:	989.8°C(Boiling point)	2830°C(Boiling point)
Flash point:	No data	No data
Explosion range:	No data	No data
Steam pressure:	0.133kPa (793K : 520°C)	1.1 × 10^{-9}atm (27°C)
Steam density(Air=1):	No data	No data
Specific Gravity:	6.0-6.25g/cm^3	5.35g/cm^3(25°C)
Solubility:	Insoluble(benzene, CO2)	Soluble in hot sulfuric acid, nitric acid and aqua regia.
Octanol/Water Partition Coefficient:	No data	No data
Spontaneous combustion temperature:	340°C	No data
Decomposition temperature:	No data	No data
Threshold of odor:	No data	No data
Evaporation speed (Butyl acetate= 1):	No data	No data
Combustion property (Solid, Gas):	No data	No data
Viscosity:	No data	No data

[Sb]

Appearance, physical state,form,color:	Silver to white, shiny and brittle metal, or dark gray powder.
Odor:	No data
pH:	No data
Melting point, Coagulating point:	630°C(Melting point)
Boiling point, Initial boiling point and Boiling range:	1635°C(Boiling point)
Flash point:	No data
Explosion range:	No data
Steam pressure:	133 Pa(886°C)
Steam density(Air=1):	No data
Specific Gravity:	6.7
Solubility:	Insoluble (water) No data (organic solvent)
Octanol/Water Partition Coefficient:	No data
Spontaneous combustion temperature:	No data
Decomposition temperature:	No data
Threshold of odor:	No data
Evaporation speed (Butyl acetate= 1):	No data
Combustion property (Solid, Gas):	No data
Viscosity:	No data

10.Stability and reactivity

[Te]

Chemical Stability:	Particles scatter finely in the air and generate explosive mixed gas.
Incompatibilities with Other Materials:	React violently with halogen or interhalogen compounds and cause risk of fire and explosions. React with zinc white-hotly.
Conditions to Avoid:	In case of heating, occur toxic fumes.
Hazardous Polymerization:	Lithium silicide erode Tellurium white-hotly. Caution against contacting with halogen and interhalogen compounds.
Hazardous Decomposition Products:	In case of combustion, likely to generate toxic fumes.

[Ge]

Chemical Stability:	Stable in the air, oxidize over glow. Acid, alkali: Fairly stable. Insoluble in hydrochloric acid.
Incompatibilities with Other Materials:	React with hot sulfuric acid, nitric acid and aqua regia, sodium peroxide, sodium hypochlorite etc.
Conditions to Avoid:	Keep away strong oxidizing agents, halogen species, aqua regia, heat, flame, spark.
Hazardous Polymerization:	No data
Hazardous Decomposition Products:	No data

[Sb]

Chemical Stability:	Ignite by surface at high temperature, spark or bare fire.
Incompatibilities with Other Materials:	In case of contacting or mixing with chlorine, occuring violent reactions with a blaze and generate toxic antimony chloride(V). In case of contacting with sulfuric acid of high temperature, react and occur toxic and corrosive sulfur dioxide(gas). In case of contacting or mixing with various metal powder,likely to cause risk of explosion. React violently with oxidizing agents(halogen, alkali permanganate, nitrate etc.) or metal powder and cause risk of fire and explosions. In case of contacting with acid, likely to generate toxic gas(Stibine).
Conditions to Avoid:	High temperature, Generation of dust.
Hazardous Polymerization:	Chlorine, nitric acid of high temperature, metal powder, oxidizing agents(halogen, alkali permanganate, nitrate etc.)
Hazardous Decomposition Products:	Not applicable(element) In case of combustion, generate toxic fumes(antimony oxide).

11.Toxicological information

[Te]

Acute toxicity:	Oral	Rat	LD_{50}	83mg/kg
	In case of ingesting, can be hazardous (Division3)			
	Dermal: No data			
	Inhalation(dust)	Rat	LC_{50}	>2.42mg/L/4H Impossible to classify because of insufficient data.

Skin corrosive, Irritation:	Division2 (Skin irritation)
Heavy injuries to eyes・Irritation:	Division2A-2B (Heavy irritation of eyes)
Sensitization of respiratory organs or skin:	No data
Variation of germ cell:	No data
Carcinogenicity:	No data
Genital toxicity:	Division2 Likely to have a bad influence on genital faculty or fetus. (Division2)
Specific target organs, General toxicity:	Division2(peripheral nerves), Division3(irritation of the respiratory tract)
(Single exposure):	Likely to cause impediment of peripheral nerves.(Division2) Likely to cause impediment of to the respiratory organs.
Specific target organs, General toxicity:	Impossible to classify
(Repetition exposure):	
Hazardous of Inhalational respiratory organs:	No data

[Ge]

Acute toxicity:	Oral	No information
	Dermal	No information
Skin corrosive, Irritation	No data	
Heavy injuries to eyes・Irritation	No data	
Sensitization of respiratory organs or skin:	No data	
Variation of germ cell:	No data	
Carcinogenicity:	No data	
Genital toxicity:	No information	
Specific target organs, General toxicity:	No data	
(Single exposure):		
Specific target organs, General toxicity:	No data	
(Repetition exposure):		
Hazardous of Inhalational respiratory organs:	No data	

[Sb]

Acute toxicity:	Oral Rat LD_{50} 7000mg/kg Impossible to classify: Possible to be "Out of division",however,this is a data of Dermal: No data Inhalation(dust) : No data
Skin corrosive, Irritation:	Impossible to classify: Possible to have skin irritation based on the mention of "Have irritation to skin",however,this is a data of Priority 2.
Heavy injuries to eyes· Irritation:	Impossible to classify: Possible to have eye irritation based on the mention of "Have irritation to eyes",however,this is a data of Priority 2.
Sensitization of respiratory organs or skin:	No data
Variation of germ cell:	No data
Carcinogenicity:	Impossible to classify: Based on the decision of experts. (No information of toxicity and the existent classification.)
Genital toxicity:	Impossible to classify because of insufficient data.
Specific target organs, General toxicity:	No data
(Single exposure):	
Specific target organs, General toxicity:	Division2(respiratory prgans)
(Repetition exposure):	Likely to cause impediment of respiratory organs by long- term or repetition exposure.
Hazardous of Inhalational respiratory organs:	No data

12.Ecological information

Acute hazardous top the aquatic Environmental:	Impossible to classify because of insufficient data.
Chronic hazardous top the aquatic Environmental:	Impossible to classify because of insufficient data.

13.Disposal considerations

The rest of waste:	Obey the relevant law as to the disposal of wastes. Dispose by manufacturers in case of returning backing plate etc. to reuse.

14.Transport information

IMAG(P.4157)Class	None Known.
ICAO/IATA:Class	None Known.
UN/NA	None Known.

15.Regulations

US federal regulations	No information
TSCA is not required.	
International regulations	No information
Canadian Domestic Substance list:	None known.

Information about limitation of use: For use only by technically qualified individuals.

16.Other information	The information is revised by the new knowledge. Although the information herein is based on the best of our knowledge, we cannot guarantee the accuracy or completeness of the information contained.

發行： 2011 年 4 月 6 日

第 技 WQ-1401 号

錸德科技股份有限公司 御中

技 術 資 料

Material Safety Data Sheet

・GeCr　　T ATZ-11B73　　1/6～6/6

承 認	確 認
品保協理	業務課長　品保課長

台灣菱真電子材料股份有限公司

Material Safety Data Sheet

Date of making : 21 Feb. 2011

1.Substance identity and company contact information

Product name:	GeCr Target
Company:	MITSUBISHI MATERIALS CORPORATION
Address:	KFC Bldg.8F,1-6-1,YOKOAMI,SUMIDA-KU,TOKYO 130-0015
Telephone Number:	81-3-5819-7320
Emergency Telephone Number:	81-79-568-2300(MITSUBISHI MATERIALS Co. Sanda Plant)
FAX Number:	81-3-5819-7321
Recommended use and restraint:	Sputtering Target

2.Hazards identification

GHS classification

Physical and chemical hazards	Sort of Gunpowder	Out of classification
	Combustibility, Ignition gas	Out of classification
	Combustibility, Ignition aerosol	Out of classification
	Oxidizing gas	Out of classification
	High pressure gas	Out of classification
	Ignition liquid	Out of classification
	Combustibility solid	Out of division
	Self reaction chemical	Out of classification
	Spontaneous combustion liquid	Out of classification
	Spontaneous combustion solid	Out of division
	Self heating chemical	Out of division
	Water reaction combustibility chemical	Out of classification
	Oxidizing liquid	Out of classification
	Oxidizing solid	Out of classification
	Organic dioxide	Out of classification
	Metal corrosive substance	Impossible to classify
Adverse human health effects	Acute toxicity(Oral)	Impossible to classify
	Acute toxicity(Dermal)	Impossible to classify
	Acute toxicity(Inhalation:Gas)	Out of classification
	Acute toxicity(Inhalation:Steam)	Impossible to classify
	Acute toxicity(Inhalation:Dust)	Impossible to classify
	Acute toxicity(Inhalation:Mist)	Out of classification
	Skin corrosive, Irritation	Impossible to classify
	Heavy injuries to eyes, Irritation	Division2B
	Sensitization of respiratory organs	Division1
	Sensitization of skin	Division1
	Variation of germ cell	Division2
	Carcinogenicity	Out of division
	Genital toxicity	Impossible to classify
	Specific target organs, General toxicity (Single exposure)	Division2 (General toxicity) Division3 (Irritation of the respiratory tract)
	Specific target organs, General toxicity (Repetition exposure)	Impossible to classify
	Hazardous of Inhalational respiratory	Impossible to classify
Environmental effects	Acute hazardous top the aquatic Environmental	Impossible to classify
	Chronic hazardous top the aquatic Environmental	Impossible to classify

Label element

Symbol:

Alert Words: Danger

Hazards information:

Eye irritation.
In case of inhaling, likely to cause allergy, asthma or dyspnea.
Likely to cause allergic skin reaction.
Suspected fears of hereditary disease.
Likely to cause impediment of general toxicity.
Likely to irritate respiratory organs.
Minute powder can be ignitable or likely to cause dust explosion.
Dermal absorption is hazardous.
Irritate mucous membrane of eyes.
Irritate lungs and the upper respiratory tract.
Likely to affect kidneys, liver or blood.

Caution:

【Safety Measure】
Not to handle until understand all safety directions.
Not to do eating, drinking and smoking while using.
Avoid exposure by using personal protective equipment and ventilation system.
Use appropriate protections for respirators.
Wear appropriate protective gloves.
Not to inhale dust.
Wash hands carefully after use.
Not to carry out the dirty work clothes.
Use outside or a area with good ventilation only.
Wear appropriate protective eyeglasses and face protections.
【First aid】
In case of inhaling, move sufferers to place filled with fresh air, and let repose with posture easy to breath.And contact a physician immediately.
Eye contact: Gentry rinse the affected eyes with clean water. In case of wearing contact lens, better to remove them.
Skin contact: Flushing with water and soap gently.
Wash the dirty work clothes in case of reuse.
In case of an exposure or risk of it, arrange for transport to nearest medical facility for examination and treatment by a physician.
If eye irritation persists, arrange for transport to nearest medical facility for examination and treatment by a physician.
If develop symptoms of respiratory disease, arrange for transport to nearest medical facility for examination and treatment by a physician.
If feel skin irritation or have eruptions, arrange for transport to nearest medical facility for examination and treatment by a physician.
Take off the dirty work clothes.
【Storage】
Store in locked place.
Intercept from the sunlight and store in location with good ventilation.
【Disposal】
Obey the relevant law as to the disposal of wastes.

3.Chemical composition and data on components

Chemical substance

	[Cr]	[Ge]
Chemical composition:	Cr	Ge
Other name:	No information	No information
Element:	Cr (Chrome)	Ge (Germanium)
Chemical distinction (Chemical formula or structure formula):	No information	No information
CAS No:	7440-47-3	7440-56-4
Reference Number in Gazetted List in Japan:	Not applicable	Not applicable
Contamination and stable additive contribute classification:	No information	No information
Concentration or concentration range:	No information	No information

4.First-aid measures

Inhalation:	Move sufferers to place filled with fresh air, and let repose with posture easy to breath. Arrange for transport to nearest medical facility for examination and treatment by a physician.
Skin contact:	Contact a physician immediately. Flushing with water and soap immediately. If feel skin irritation or have eruptions, arrange for transport to nearest medical facility for examination and treatment by a physician. Arrange for transport to nearest medical facility for examination and treatment by a physician. Take off the dirty work clothes. Wash the dirty work clothes in case of reuse.
Eye contact:	Gentry rinse the affected eyes with clean water. In case of wearing contact lens, better to remove them. If irritation persists, arrange for transport to nearest medical facility for examination and treatment by a physician. Arrange for transport to nearest medical facility for examination and treatment by a physician.
Ingestion:	Rinse mouth with water. Arrange for transport to nearest medical facility for examination and treatment by a physician. Make sure of remaining conscious and make spit out.
Expected acute symptom or in behind:	Inhalation: Cough. Eye: Redness, pain, drug wound. Skin contact: Redness, pain, drug wound. Ingestion: Refer to section"Inhalation".
Most important indications or symptom:	No information

5.Fire-fighting measures

Extinguish media:	Dry chemicals, carbon dioxide, foam, dry sand. Fire of the periphery: Use appropriate extinguish media according to the fire circumstances.
Forbidden extinguish media:	Water
Special hazards:	Likely to occur irritate, toxic or corrosive gas and fumes by fire. If use water in case of metal fire, likely to occur hydrogen gas.
Special extinguish way:	Move containers from fire area if not in danger. Desirable sealing way and choking extinguish in case of metal fire.
Protection for fire-fighters:	Fire-fighters should wear proper protective and self-contained breathing apparatus with full facepiece operated in positive pressure mode.

6.Accidental release measures

Caution for the human body, protective and emergency measure:	Isolate all direction with appropriate distance as leakage area immediately. Keep out without authorized personnel. Use proper personal protective equipment as indicated in Section8 to avoid contacting eyes and skin or inhalation of gas or fume.
Caution for the environment:	Stay windward. Leave lowland areas. Not to contact leakages and walk in them. Caution not to affect the environment by discharging rivers. Avoid emitting to the environment.
Retrieve, Neutralization:	Sweep leakages and retrieve empty containers. Afterward dispose it.
Containment and cleaning way :	Stop leaking if not in danger.
Prevention of secondary disaster:	Dispose frequently. Likely to slide if remaining on the floor . Remove all ignition source and combustion substance immediately. (Smoking nearby, spark and flame is prohibited.) Prevent from flowing into ditches,sinks,basements or closed place.

7.Handling and storage

Handling:

Technical measure:	Do appropriate engineering controls and use proper personal protective equipment as indicated in Section8.
Ventilation:	Do appropriate ventilation as indicated in Section8.
Caution for safety handling:	Not to handle until understand all safety directions.
	Not to contact, inhale and swallow.
	Use adequate ventilation(exhaust) to keep airborne concentrations under the limit of exposure.
	Not to do eating, drinking and smoking while using. Wash hands carefully after use.
	Use outside or well ventilated area only.
	Do electrostatic measure. Wear conductive work clothes and put on conductive safety shoes .
	Not to inhale dust and fumes.
Avoidance of contact:	Refer to Section10.

Storage:

Technical measure:	Set up facilities equipped with adequate lighting and ventilation to store and handle dangerous objects in storage place.
Hazardous Polymerization:	Refer to Section10.
Conditions to storage:	Store in locked place.
	Keep in closed package and store in location with good ventilation.
	Store separate from ignition source like heat,spark,bare fire. No smoking.
	Store separate from hazardous polymerization.
Materials of containers or package:	Keep in closed and undamageable package, but no regulation of package or containers.

8.Exposure control and personal protection

Control concentration: Not set.

Allowance concentration (Exposure limit, Biological exposure indicator) :

ACGIH	**(2005ver.)**	TLV-TWA	Cr: 0.5mg/m^3 (Metal)	A4
	(2006ver.)	TLV-TWA	Ge: 10mg/m^3(Aspirating dust), 3mg/m^3(Inhaling dust)	

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations under the limit of exposure.

In case of occurring dust or fume in high temperature process, set up ventilation device to keep air pollutive substances under control concentration.

Set up partial ventilation prevented from explosion.
Not handle without using sealed devices, machinery, or partial ventilation.
Take measures (seal the process, partial ventilation etc.) to keep airborne concentrations under the recommended control concentration.

Personal Protective Equipment:

Respiratory organs:	Use appropriate respirators.
	If there's a possibility of exposure, use air sending mask, air respirator or oxygen
	Use appropriate positive pressure air respirators whenever use this substance.
Hands:	Wear appropriate protective gloves.
	Wear thermal gloves.
Eyes:	Wear appropriate protective eyeglasses(standard glasses type, standard glasses with side board type, goggles type)
Skin and Body:	Wear appropriate protective clothing and face protections.
Sanitary measure:	Wash hands carefully after use.
	Not to carry out the dirty work clothes.

9.Physical and chemical properties

	[Cr]	[Ge]
Appearance, physical state,form,color:	Gray powder	Grayish white.
Odor:	No data	No data
pH:	No data	No data
Melting point, Coagulating point:	1900°C(Melting point)	937°C(Melting point)
Boiling point, Initial boiling point and Boiling range:	2642°C(Boiling point)	2830°C(Boiling point)
Flash point:	Incombustible	No data
Explosion range:	No data	No data
Steam pressure:	1Pa (1383°C)	1.1×10^{-9}atm (27°C)
Steam density(Air=1):	No data	No data
Specific Gravity:	7.14	5.35g/cm^3(25°C)
Solubility:	Insoluble (water) No data (organic solvent)	Soluble in hot sulfuric acid, nitric acid and aqua regia.
Octanol/Water Partition Coefficient:	log Pow = 0.23(EST)	No data
Spontaneous combustion temperature:	400°C(Cloud) ,580°C(Layer)	No data
Decomposition temperature:	No data	No data
Threshold of odor:	No data	No data
Evaporation speed(Butyl acetate= 1):	No data	No data
Combustion property(Solid, Gas):	No data	No data
Viscosity:	No data	No data

10.Stability and reactivity

[Cr]

Chemical Stability:	Stable under normal handling conditions.
Incompatibilities with Other Materials:	React violently with strong oxidizing agents(hydrogen peroxide etc.) and cause risk of fire and explosions.
Conditions to Avoid:	React with dilute hydrochloric acid or dilute sulfuric acid. If mix with the air, likely to cause dust explosion. (powder, granule)
Hazardous Polymerization:	Strong oxidizing agents, dilute hydrochloric acid, dilute sulfuric acid, alkali, alkali carbonate.
Hazardous Decomposition Products:	In case of combustion, likely to generate irritative or toxic fumes or gas.

[Ge]

Chemical Stability:	Stable in the air, oxidize over glow. Acid, alkali: Fairly stable. Insoluble in hydrochloric acid.
Incompatibilities with Other Materials:	React with hot sulfuric acid, nitric acid and aqua regia, sodium peroxide, sodium hypochlorite etc.
Conditions to Avoid:	Keep away strong oxidizing agents, halogen species, aqua regia, heat, flame, spark.
Hazardous Polymerization:	No data
Hazardous Decomposition Products:	No data

11.Toxicological information

[Cr]

Acute toxicity:	Oral:	Impossible to classfy because of no data.
	Dermal:	Impossible to classfy because of no data.
	Inhalation(dust) :	Impossible to classfy because of no data.
Skin corrosive, Irritation:	Impossible to classify because of insufficient data.	
Heavy injuries to eyes・Irritation:	Eye irritation (Division2B)	
Sensitization of respiratory organs or skin:	Sensitization of respiratory organs: Division1 (In case of inhaling, likely to cause allergy, asthma or dyspnea.)	
	Sensitization of skin: Division1 (Likely to cause allergic skin reaction.)	
Variation of germ cell:	Suspected fears of hereditary disease. (Division2)	
Carcinogenicity:	Out of division.	
Genital toxicity:	Impossible to classify because of insufficient data.	

Specific target organs, General toxicity:	Likely to cause impediment of general toxicity. (Division2)	
(Single exposure):	Likely to irritate respiratory organs. (Division3)	
Specific target organs, General toxicity:	Impossible to classify because of insufficient data.	
(Repetition exposure):		
Hazardous of Inhalational respiratory organs:	Impossible to classify because of insufficient data.	
[Ge]		
Acute toxicity:	Oral	No information
	Dermal	No information
Skin corrosive, Irritation	No data	
Heavy injuries to eyes・Irritation	No data	
Sensitization of respiratory organs or skin:	No data	
Variation of germ cell:	No data	
Carcinogenicity:	No data	
Genital toxicity:	No information	
Specific target organs, General toxicity:	No data	
(Single exposure):		
Specific target organs, General toxicity:	No data	
(Repetition exposure):		
Hazardous of Inhalational respiratory organs:	No data	

12.Ecological information

Acute hazardous top the aquatic Environmental:	Impossible to classify because of insufficient data.
Chronic hazardous top the aquatic Environmental:	Impossible to classify because of insufficient data.

13.Disposal considerations

The rest of waste:	Obey the relevant law as to the disposal of wastes. Dispose by manufacturers in case of returning backing plate etc. to reuse.

14.Transport information

IMAG(P.4157)Class	None Known.
ICAO/IATA:Class	None Known.
UN/NA	None Known.

15.Regulations

US federal regulations	No information
TSCA is not required.	
International regulations	No information
Canadian Domestic	No information
Substance list:	None known.

Information about limitation of use: For use only by technically qualified individuals.

16.Other information

The information is revised by the new knowledge. Although the information herein is based on the best of our knowledge, we cannot guarantee the accuracy or completeness of the information contained.

MATERIAL SAFETY DATA SHEET
SILVER TARGET

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MSDS Name： Silver Target
Manufacturer/Supplier：SOLAR APPLIED MATERIALS TECHNOLOGY CORP.
Using suggestion and restrictions：Sputtering Targets
Add：NO.1, Gongye 3rd RD., Annan Dis., Tainan City 70955, Taiwan.
Emergency Number: 886-6-5110123
Fax: 886-6-3841758

SECTION 2 - HAZARDS IDENTIFICATION

Hazardous Material Category： —
Hazard Symbols:—
Sing： —
Warn： —
Hazard Statements： Solid. No related harmful information available

SECTION 3 - COMPOSITION, INFORMATION ON INGREDIENTS

Pure material

CAS-No:	Silver：7440-22-4	EC-Index-No:	—
Percent：	≒100wt%	EC-No:	—
Formula Hill:	Silver		

Mixtures:

Chemical properties:—	
Chinese and English names of the hazardous ingredients	Concentration or concentration ranges (ingredient percentage)
—	—

SECTION 4 -First-aid measures

The first aid measures for different exposure routes:

inhalation: 1. remove to places for fresh air. 2. If breathing is stopped, execute artificial respiration. 3. Keep the injured person warm and rest. 4. Seek for medical treatment immediately.

skin contact: 1.Remove contaminated clothing immediately 2. Flush with water as least 15 minutes.

eye contact: 1. Flush eyes with Plenty of water. 2. Seek for medical treatment immediately.

ingestion: Seek for medical treatment immediately.

SECTION 5 – FIRE-FIGHTING MEASURES

Suitable fire extinguishing media: In the light of the around fire, choose Suitable fire extinguishing media.

Specific hazards may be encountered during fire-fighting: 1.Non-combustible If existence by massive form. 2.If the fine powder contacts fire, there is the risk of having fire.3. May produce the noxious gas during combustion. Need to wear

appropriate protective clothing and breathing apparatus.
Specific fire-fighting methods: 1. In the condition of safety, remove containers from scene on fire.
2. Cool the storage tank or the vessel in scene on fire by mist or water.
Special equipment for the protection of firefighters: —

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions:
Avoid skin contact. Need to wear breathing apparatus if there is dust.
Environmental precautions: —
Methods for cleaning up:
Containment of the leakage of material. Deal with the leakage of material by Appropriate containers

SECTION 7 - HANDLING AND USE

Handling：
Wear personal protective suit when operation. Avoid inhalation of dust. Avoid contacting with skin or eyes.
Storage:
Store in a cool, dry and well-ventilated place. Keep away from incompatible material.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION

Engineering control：

Control parameters:

8 hours time weighted average exposure limits TWA	Short-term exposure limits STEL	maximum exposure limits biological standards CEILING	BEIs
—	—	—	—

Personal protective equipment: （Exposed in the state of pulverulence）
Respiratory protection: Respiratory apparatus
Hand protection: Protective gloves
Eye protection: Chemical protective glasses or safety goggles
Skin and body protection: Aprons, work shoes

Hygiene measures: 1.Take off the contamination clothes as soon as possible after operation. 2.No smoking or the diet in the workplace. 3. After processing this thing , wash hands thoroughly with soap4. Maintain the workplace clean.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

physical state: Solid、white	**Odor:** Metallic pieces, no odor.
Odor threshold: N/E or N/A	**Melting point:** 961.9℃
pH value: —	**Boiling point/boiling point range:** 2212℃
Flammability (solid, gas)：N/E or N/A	**Flash point:** —°F ℃ **Test method:** —

Decomposition temperature: N/E or N/A	**Explosion limits:** N/E or N/A
Auto-ignition temperature: N/E or N/A	**Vapor density:** N/E or N/A
Vapor pressure: N/E or N/A	**Solubility:** Insoluble
Density: 10.49	**Evaporation rate:** N/E or N/A
Partition coefficient(n-octanol/water,log Kow):—	

SECTION 10 - STABILITY AND REACTIVITY

Stability: Stable Under the normal condition
Possible hazardous reactions under specific conditions:—
Conditions to avoid: Avoid generating dust
Materials to avoid: Strong acid、Alkali. If getting wet, powder will turn up self-heating.
Hazardous decomposition products: —

SECTION 11 – TOXICOLOGICAL INFORMATION:

Routes of exposure: .Eyes injury. 2.Lead skin into blue. 3.Excessive inhalation of the silver vapor will cause damage to lungs.
Symptoms:
LD50：≧— mg/kg
LC50：≧ —mg/m^3/4H
LDL0：— mg/kg
Chronic toxicity or long term toxicity:—

SECTION 12 - ECOLOGICAL INFORMATION：

Ecotoxicity:—
Persistence and degradability:—
Bioaccumulative potential:—
Mobility in soil:—
Other adverse effects:—

SECTION 13 - DISPOSAL CONSIDERATIONS

Methods of waste disposal: Disposal in accordance with the present laws and regulations.

SECTION 14 - TRANSPORT INFORMATION

United Nations number(UN No): No information available
UN Proper shipping name: No information available
Transport hazard class(es): No information available
Packing group: No information available
Marine pollutant(Yes/No): No

SECTION 15 - REGULATORY INFORMATION

Applicable regulations: In accordance with the present laws and regulations.

SECTION 16 - OTHER INFORMATION

Issued By: SOLAR APPLIED MATERIALS TECHNOLOGY CORP.

Creation Date: December 2011

The information above is believed to be accurate and represents the best information which is currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

MATERIAL SAFETY DATA SHEET

1. IDENTIFICATION OF SUBSTANCE

Product name: ZRT-01 solid compound ingot

Manufacturer/Supplier:

Toshima MFG Co.,Ltd.
Materials System Division
1414 Shimonomoto Higashimatsuyama-shi, Saitama 355-0036 Japan
Phone +81-493-24-6774
Fax +81-493-24-6715
E-mail webmaster@material-sys.com

2. CHEMICAL IDENTIFICATION

Compound Element name	Molecular Ratio	Cas No.	UN Number
Zirconium oxide(ZrO2) Yttrium oxide(Y2O3) Titanium oxide(TiO2)	ZrO2 77.6 mol% Y2O3 2.4 mol% TiO2 20.0mol%	ZrO2: 1314-23-4 Y2O3: 1314-36-9 TiO2: 13463-67-7	Not applicable

UN Class: None, UN # None as alloy

3. HAZARDS INGREDIENT

(as a ZrO2 powder)

Classification: non-inflammability.

Dangerous: non-dangerous.

Poisonous: If inhale in long time, it may affect to lungs.

Stimulus: Stimulus to membranes.

(as a Y2O3 powder)

Classification: Not applicable.

Harmfulness: If inhale the dust, stimulus to nose, throat and trachea.

(as TiO2 powder)

Classification: Not applicable.

Dangerousness: No data.

Poisonousness: Repeat or long time exposure, may stimulus to eye and mucous membrane.

Environmental influence: No data.

4. MAKESHIFT MEASURE

Eye contact: Wash more than 15 minutes with running water immediately, and see the doctor.

Skin contact: Wash touch part with running water. If skin color change or painful, see the doctor.

Inhalation: Blow nose and gargle, when inhale much, move to fresh air place and see the doctor.

Swallow: Gargle immediately then drink plenty of water and see the doctor.

5. FIRE FIGHTING MEASURES

EXTINGUISH MEDIA: Non-inflammable.

Keep out from fireplace, escape from leeward. If container is near by fireplace, move it to safety place. When extinguishing, wear protection clothes and respiration equipments.

FIREFIGHTINGS: Water, powder, carbon-dioxide.

6. ACCIDENTIAL RELEASE MEASURES

Collect overflow as much as possible, suck it with a cleaner. Wash surface with powder or water. The overflow must not be drained off into sewer.

7. HANDLING AND STORAGE

Handling with care by no breathing. No eye and skin contact, wear protecti0n clothes and wash hand well after work.

CUSTDY: Storage in dry, cool and dark place.

EQUIPMENT COUNTERMEASURE: Handle in well ventilated place, and require to use with sealed up ventilated room and equipment.

PROTECTION: Respiration assists: Dust mask, respiration equipment.

Eye protection: Goggle type glasses.

Protection gloves: Anti-heat safety protection gloves.

Others: Protection clothes, long boots and apron.

8. PHYSICAL AND CHEMICAL PROPERTIES

(as a ZrO2 powder)

Appearance: White color solid.

Boiling point: 4300℃.

Melting point: 2700℃

Density: 5.49

Dissolve: Non-dissolve to water, soluble to Hydrochloric acid, Dilute nitric acid, Dilute sulfuric acid.

(Y2O3)

Appearance: White color powder.

Melting point: 2356 ～ 2435℃.

Density: 4.84

Dissolution: Non-dissolve to water, soluble to acid.

(As TiO2 powder)

Appearance: White color powder.

Melting point: 1825℃

Density: 4.17

Dissolvement: Non-dissolve to water, hydrochloric acid and Nitric acid. Dissolve to Alkali.

9. DANGEROUSNESS INFORMATION

No data both for ZrO2, Cr2O3.

10. DISPOSAL CONSIDERATION

Request to the licensed expert.

11. TRANSPORTATION

Make sure not to leaking and load with carefully.

12 OTHER INFORMATION

The above information is believed to be correct but does not purport to be all-inclusive and shall be used only as a guide. Toshima shall not be held liable for any damage resulting from handling or from contact with the above product.

Safety Data Sheet

KAYAKU CHEMICAL（WUXI） CO.,LTD.

Date of issue :30. June 2009
Trade name : KAYARAD DVD-770

1. Identification of the product and of the company.

1.1 Product name : KAYARAD DVD-770
1.2 Company name : KAYAKU CHEMICAL（WUXI） CO.,LTD.
Address : XIBEI TOWN，XISHAN，WUXI，JIANGSU，CHINA
Emergency phone number : +86-0510-83780313（CHINA）
FAX number : +86-0510-83780893（CHINA）

2. Composition / information on ingredients

2.1 Substance/Mixture

Mixture

2.2Chemical name

Mixture of acrylate monomers, acrylate oligomers, photoinitiators, and additives

2.3 Ingredients and composition

	wt%	CAS registry
□Acrylate monomers	40～80	Trade secret
□Acrylate oligomers	20～60	Trade secret
□Photoinitiators	3～10	Trade secret
□Additive	0～5	Trade secret

3. Hazards identification

3.1 EMERGENCY OVERVIEW:

Yellowish liquid

Skin irritant

3.2 POTENTIAL HEALTH EFFECTS:

INHALATION : Mist or vapour are irritating to the eye, nose, throat and lungs. May cause cough and may cause health effects such as inflammation of the lungs and infection of the bronchi.

EYE CONTACT : May cause irritation.

SKIN CONTACT : Maybe harmful by skin absorption, or cause irritation.

INGESTION : Maybe harmful

4. First aid measures

4.1 Eye contact:

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.

4.2 Skin contact:

Remove contaminated clothes. Rinse and then wash skin with water and soap.

Refer for medical attention.

4.3 Inhalation of aerosol /vapour /dust :

Fresh air, rest.

Refer for medical attention.

4.4 Ingestion or accident:

Rinse mouse.

Do NOT induce vomiting.

Rest.

Refer for medical attention.

5. Fire fighting measures

5.1 Extinguishing media:

Alcohol-resistant foam, powder, AFFF, foam, carbon dioxide.

5.2 Special advice in case of fire:

Firefighters should wear self-contained breathing apparatus and eye protection in fighting significant fires in which this material is involved.

Keep Drums, etc., cool by spraying with water.

6. Accidental release measures

6.1 After spillage, leakage, gas leakage

Extra personal protection: Self-contained breathing apparatus

Collect leaking and spilled liquid in sealable containers as far as possible.

Absorb remaining liquid in sand or inert absorbent and remove to safe place.

DO NOT wash away into sewer.

Avoid breathing vapors and remove ignition sources.

7. Handling and storage

7.1 Handling

Avoid contact with skin and eyes, protective goggles, aprons etc...

No open flames, No sparks, and No smoking.

7.2 Storage

Fireproof.

Store in a cool, dry, well-ventilated location.

No open flames and No sparks.

Separated from strong oxidants, strong acid.

8. Exposure controls and personal protection

8.1Exposure control

No data

8.2 Personal protective equipment

Respiratory	: Industrial canister gas masks
Inhalation	: Ventilation, local exhaust, or breathing protection.
Eyes	: Safety spectacles, face shield, or eye protection in combination with breathing protection.
Skin	: Protective gloves. Protective clothing.
Ingestion	: Do not eat, drink, or smoke during work.

9. Physical and chemical properties

Flash point	: 155℃(Cleaveland open cup)
Viscosity	: 330~530 mPa·s at 25 oC
Solubility in water	: insoluble

10. Stability and reactivity

10.1 Stability

Stable (under suitable condition).

10.2 Conditions to avoid

Open flames and Sparks.

Strong oxidants, Strong acid.

Heat

Sunlight

10.3 Materials to avoid

Acids, alkaline, amines, peroxides, oxidizing agents.

11. Toxicological information

No data

12. Ecological information

No data

13. Disposal considerations

Local regulations should be adhered to.

Disposal of empty containers.

14. Transport information

UN Number : Not applicable

IMDG Code : Not applicable

ICAO/IATA : Not applicable

Keep away from oxidizing materials and source of ignition.

Follow all regulations in your country.

Confirm containers have no rent or leak before loading.

15. Regulatory information

Follow all regulations in your country.

	CAS No.	TSCA	EINECS	ENCS
Acrylate monomers	Reg.	Reg.	Reg.	Reg.
Acrylate oligomers	Reg.	Reg.	Reg.	Reg.
Photoinitiators	Reg.	Reg.	Reg.	Reg.
Additives	Reg.	Reg.	Reg.	Reg..

16. Other information

・This product is intended for industrial use only. Should it ever be applied for medical or other purposes, this is completely the responsibility of the purchaser.

・Ingesting or injecting this product or using it in such a manner that some of it might remain within the body is forbidden. Do not do this under any circumstances.

・This information is based upon the latest data available to us, but should not be read as a guarantee of the contents, physical properties or danger and harmfulness levels. Since all chemicals may have hitherto unknown deleterious properties, care should always be taken during use. It is the responsibility of every user to establish the necessary safety precautions before employment. In addition, the present information is intended for normal usage; however, if special usage is contemplated, then the appropriate safety precautions and application conditions should be carefully prepared.