1. IDENTIFICATION OF THE PRODUCT AND OF THE COMPANY

1.1. Identification of the product: Finished wafer _ Al process
1.2. Use of the product: Components of electrical and electronic equipments
1.3. Company identification: Company name: United Microelectronics Corporation (UMC) Address: No. 3, Li-Hsin 2nd Road, Hsinchu Science Park, Hsinchu City 30078, Taiwan (R.O.C.) Telephone number: 886-3-5782258 & FAX number: 886-3-5778271 Sheet prepared by: Michelle Chang & E-mail: michelle_chang@umc.com
1.4. Emergency telephone: 886-3-5782258 ext.: 31752

2. HAZARDS IDENTIFICATION

2.1. GHS classification & symbol: NA
2.2. Hazard statement: Physical and chemical hazards: NA Human health and environments effects: NA Principal hazards: NA Specifics hazards: NA

3. COMPOSITION/ INFORMATION ON INGREDIENTS

ELEMENT	CAS NUMBER	CONTENT (% Weight)
Boron (B)	7440-42-8	0.0000168
Aluminum (Al)	7429-90-5	1.9725806
Titanium (Ti)	7440-32-6	0.4795968
Tungsten (W)	7440-33-7	0.8653226
Silicon (Si)	7440-21-3	96.6735102
Arsenic (As)	7440-38-2	0.0006670
Magnesium (Mg)	7439-95-4	0.0000024
Potassium (K)	7440-09-7	0.0000040
Calcium (Ca)	7440-70-2	0.0000321
Iron (Fe)	7439-89-6	0.0000065
Copper (Cu)	7440-50-8	0.0082097
Zinc (Zn)	7440-66-6	0.0000371
Sodium (Na)	7440-23-5	0.0000034
Phosphorus (P)	7723-14-0	n.d.(MDL=40ppb)
Fluorine (F)	7782-41-4	n.d.(MDL=50ppm)
Nickel (Ni)	7440-02-0	0.0000017
Cobalt (Co)	7440-48-4	0.0000006
Tantalum (Ta)	7440-25-7	0.0000043
Antimony (Sb)	7440-36-0	0.0000042
Sum in total		100

4. FIRST AID MEASURES

4.1. General information:

Inhalation: NA

Skin contact: NA

Eye contact: NA

Ingestion: NA

4.2. Symptoms/Effects:

Acute: NA

Delayed: NA

4.3. Advice to doctor: NA

5. FIRE-FIGHTING MEASURES

5.1. Suitable extinguishing media: NA

5.2. Unsuitable extinguishing media: NA

5.3. Specific fire and explosion hazards: NA

5.4. Additional information for firefighters & protection equipments: NA

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions: NA

6.2. Environmental precautions: NA

6.3. Methods for cleaning up: NA

7. HANDLING AND STORAGE

7.1. Handling: Keep container closed when not in use. Keep away from incompatible substances.

7.2. Storage: Keep container tightly closed and properly labeled. Store in a cool, dry and well-ventilated area away from incompatible substances. Avoid heat, flames, sparks and other sources of ignition.

7.3. Specific use(s): NA

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

8.1. Exposure limit values: TLV: NA

8.2. Exposure controls:

8.2.1. Occupational exposure controls:

Respiratory protection: NA

Hand protection: NA

Eye protection: NA

Skin protection: NA

8.2.2. Environmental exposure controls: NA

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. General Information:	
Physical state: Solid	
Color: Iron gray	
Odor: Odorless	
9.2. Important health, safety and environmental information:	
pH: NA	**Boiling point/ Boiling range: 2230 °C**
Flash point: NA	**Flammability (solid, gas): NA**
Explosive properties: NA	**Oxidizing properties: NA**
Vapor pressure: NA (air=1)	**Relative density: 2.2 g/cm3 (specific gravity)**
Solubility: NA	**Water solubility: Virtually insoluble in water**
Partition coefficient: n-octanol/water: NA	**Viscosity: NA**
Vapor density: NA	**Evaporation rate: NA**
9.3. Other information: NA	

10. STABILITY AND REACTIVITY

10.1. Stability：Stable
10.2. Conditions to avoid: Contact with powerful oxidizing agents such as Fluorine, Chlorine Trifluride, Oxygen Difluride, may cause fires.
10.3. Materials to avoid: Strong oxidizing agents.
10.4. Hazardous decomposition products: Silicon will dissolve in Hydrofluoric acid and produce a corrosive gas- Silicon Tetrafluoride.

11. TOXICOLOGICAL INFORMATION

Acute toxicity: NA
Locals effects: NA
Irritation: NA
Corrosiveness of skin: NA

12. ECOLOGICAL INFORMATION

12.1. Ecotoxicity: NA
12.2. Mobility: NA
12.3. Persistence and degradability: NA
12.4. Bioaccumulative potential: NA
12.5. Results of PBT assessment: NA
12.6. Other adverse effects: NA

13. DISPOSAL CONSIDERATIONS

Waste disposal: Landfill or recycle in accordance with local pollution regulations.
Caution: NA

14. TRANSPORT INFORMATION

14.1. Classification according to ADR: Not regulated as a hazardous material.
14.2. Classification according to IMDG: Not regulated as a hazardous material.
14.3. Classification according to IATA: Not regulated as a hazardous material.

15. REGULATORY INFORMATION

Health, safety and environmental information shown on the label according to Directives 67/548/EEC and 1999/45/EC: NA

16. OTHER INFORMATION

A material safety data sheet (MSDS/SDS) is a form with data regarding the properties of chemicals. Semiconductor wafer is not a chemical substance nor preparation and will be further processed to become components of electrical and electronic products.
This MSDS/SDS is not necessary to serve the same purpose of chemical MSDS/SDS but to fulfill our customers' needs in information of wafer property.
The format of this MSDS/SDS follows the requirements of Regulation (EC) 1907/2006 the Registration, Evaluation, Authorization and restriction (REACH) and Globally Harmonized System of Classification and Labeling of Chemicals (GHS).
Revision date: June 26, 2016