ErPdSb

Usage Procedure and Risks Assessment

By:

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Overview

- **Overview**
- **MSDS info about components (Er, Pd, Sb)**

***Physical and Chemical Properties**

***First Aid Measures**

***Fire and Explosion Data**

***Handling and Storage**

***Exposure Controls/Personal Protection**

***Stability and Reactivity Data**

Overview

- **Stability :** Each element (Er, Pd, Sb) is stable.
- **Instability Temperature**: Not available.
- **MSDS:** Unavailable for ErPdSb but available for each component (Er, Pd, Sb).

Note

1. *ErPdSb will be used for thin film deposition by "Metal –Sputter system", and all the characterization will be done in "Physics Department, IITB" .*

2. *ErPdSb is already approved for "PLD II" deposition system.*

NFPA Hazard rating of components

	Health	Flammability	Instability/ Reactivity	Personal Protection	Reason for Health Hazard
Er	3	0	0	E	Each element (Er, Pd, Sb) is slightly hazardous in case of skin & eye contact, not in case of Inhalation, because each element is in solid form.
Pd	1	1	0	E	
Sb	2	1	0	E	

Handling and storage

- **Storage :**

  Samples and Target are stored in Desiccators in cool place.

- **Handling :**

  By rubber gloves.

Physical and Chemical Properties

	Er	Pd	Sb
Physical State	Solid	Solid	Solid
Odor	No	Not available	Not available
Taste	Not available	Not available	Not available
Color	Silver metallic	Silvery-white	Silvery-white
Melting Point	1522 °C	1555 °C	630 °C
Boiling Point	2510 °C	3167 °C	1635 °C
Critical Temperature	Not available	Not available	Not available
Solubility	Insoluble in cold water	Insoluble in cold water	Insoluble in cold water

First Aid Measures

	Er	Pd	Sb
Eye contact	Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.	No known effect on eye contact, rinse with water for a few minutes.	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

	Er	Pd	Sb
Skin contact	If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands : Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.	After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.	In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

	Er	Pd	Sb
Serious skin contact	Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.	Not available	Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.
Inhalation	Allow the victim to rest in a well ventilated area. Seek immediate medical attention.	Allow the victim to rest in a well ventilated area. Seek immediate medical attention.	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

	Er	Pd	Sb
Serious inhalation	Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.	Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.	Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

	Er	Pd	Sb
Ingestion	Do not induce vomiting.Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.	Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.	Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.
Serious ingestion	Not available	Not available	Not available

Fire and Explosion Data

	Er	Pd	Sb
Flammability of the Product	Non-Flammable	Flammable	May be combustible at high temperature.
Products of Combustion	Not available	Some metallic oxides.	Some metallic oxides.
Fire Hazards in Presence of Various Substances	Not available	Not available	Not available
Auto-Ignition Temperature	Not applicable	Not available	Not available

	Er	Pd	Sb
Fire Fighting Media and Instructions	Not applicable	Flammable solid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, auto-ignition or explosion.	SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Handling and Storage

	Er	Pd	Sb
Precautions	Keep locked up Do not ingest. Do not breathe gas/fumes/ vapour/spray. Never add water to this product In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Keep container tightly closed and dry. Avoid contact with skin and eyes Keep away from incompatibles such as alkalis.	Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not breathe dust.	Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

	Er	Pd	Sb
Storage	Corrosive materials should be stored in a separate safety storage cabinet or room.	Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. Keep container dry. Keep in a cool place.	Keep container tightly closed. Keep container in a cool, well-ventilated area.

Exposure Controls/Personal Protection

	Er	Pd	Sb
Engineering Controls	No special ventilation requirements.	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

	Er	Pd	Sb
Personal Protection	Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.	Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.	Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves
Personal Protection in Case of a Large Spill	Splash goggles. Full suit. Vapour respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.	Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.	Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Stability and Reactivity Data

	Er	Pd	Sb
Stability	The product is stable.	The product is stable.	The product is stable.
Instability Temperature	Not available	Not available	Not available
Incompatibility with various substances	Reactive with alkalis. Slightly reactive to reactive with reducing agents, combustible materials, organic materials, metals, acids. Non-reactive with oxidizing agents.	Not available	Not available
Corrosivity	Non-corrosive in presence of glass.	Non-corrosive in presence of glass.	Non-corrosive in presence of glass.
Polymerization	No	No	No

Operating Procedure for Chemical Usage

- Equipment : Metal-Sputter System
- Sputtering pressure: 10^{-3} mbar
- Substrate temperature: Room temp. to 400 ^{0}C
- Area in which chemical will be used: Micro1 Lab
- Usage Timing: 11 am to 12 pm

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