1 Identification of the substance/mixture and of the company/undertaking

- Product identifier
- Trade name: **Ruthenizer 455-PF6**
- **synonyms**: cis-bis(2,2'-bipyridyl)-(2,2'-bipyridyl-4,4'-dicarboxylic acid) ruthenium(II) hexafluorophosphate
- **CAS Number**: 528838-65-5
- **Relevant identified uses of the substance or mixture and uses advised against**: Semiconductor Sensitizer
- **Application of the substance / the preparation**: Semicon ductor Sensitizer
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier**: SOLARONIX SA
  Rue de l’Ouriette 129, CH-1170 Aubonne, Switzerland
  info@solaronix.com
  T +41 21 821 22 80
  www.solaronix.com
  F +41 21 821 22 89
  info@solaronix.com
- **Emergency telephone number**: Swiss Toxicological Information Center: +41 44 251 51 51

2 Hazards identification

- **Classification of the substance or mixture**
- **Classification according to Regulation (EC) No 1272/2008**: The substance is not classified according to the CLP regulation.
- **Classification according to Directive 67/548/EEC or Directive 1999/45/EC** Not applicable.
- **Information concerning particular hazards for human and environment**: Not applicable.
- **Label elements**
- **Labelling according to Regulation (EC) No 1272/2008**: Void
- **Hazard pictograms**: Void
- **Signal word**: Void
- **Hazard statements**: Void
- **Other hazards**
- **Results of PBT and vPvB assessment**
- **PBT**: Not applicable.
- **vPvB**: Not applicable.

3 Composition/information on ingredients

- **Chemical characterization: Substances**
- **CAS No. Description**: 528838-65-5 cis-bis(2,2'-bipyridyl)-(2,2'-bipyridyl-4,4'-dicarboxylic acid) ruthenium(II) hexafluorophosphate
- **Additional information:**
  Molecular Formula: C32H24O4N6S2P2F12Ru
  Formula Weight: 947.56 g/mol

(Contd. on page 2)
4 First aid measures

- Description of first aid measures
  - General information: No special measures required.
  - After excessive inhalation: Supply fresh air; consult a doctor in case of complaints.
  - After skin contact: Generally the product does not irritate the skin.
  - After eye contact: Rinse opened eye for several minutes under running water.
  - After swallowing: If symptoms persist consult a doctor.
  - Information for doctor:
    - Most important symptoms and effects, both acute and delayed
      No further relevant information available.
    - Indication of any immediate medical attention and special treatment needed
      No further relevant information available.

5 Firefighting measures

- Suitable extinguishing agents:
  CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- Special hazards arising from the substance or mixture
  No further relevant information available.
- Advice for firefighters
  - Protective equipment: No special measures required.

6 Accidental release measures

- Personal precautions, protective equipment and emergency procedures
  Not required.
- Environmental precautions: No special measures required.
- Methods and material for containment and cleaning up: Pick up mechanically.
- Reference to other sections
  No dangerous substances are released.
  See Section 7 for information on safe handling.
  See Section 8 for information on personal protective equipment.
  See Section 13 for disposal information.

7 Handling and storage

- Handling:
  - Precautions for safe handling No special measures required.
  - Information about fire - and explosion protection: No special measures required.
- Conditions for safe storage, including any incompatibilities
- Storage:
  - Requirements to be met by storerooms and receptacles: No special requirements.
  - Information about storage in one common storage facility: Not required.
  - Further information about storage conditions: None.
  - Specific end use(s) No further relevant information available.
8 Exposure controls/personal protection

- Additional information about design of technical facilities: No further data; see section 7.
- Control parameters
- Ingredients with limit values that require monitoring at the workplace: Not required.
- Additional information:
  As a basis for the production of this document, the most current valid lists were used.
- Exposure controls
  - Personal protective equipment:
  - General protective and hygienic measures:
    The usual precautionary measures are to be adhered to when handling chemicals.
- Respiratory protection: Not required.
- Protection of hands:
  The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
- Gloves material:
  The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
- Eye protection: Not required.

9 Physical and chemical properties

- Information on basic physical and chemical properties
- General Information
- Appearance:
  - Form: Powder
  - Colour: Orange
- Odour: Characteristic
- Odour threshold: Not determined.
- pH-value: Not applicable.
- Change in condition
  - Melting point/Melting range: Undetermined.
  - Boiling point/Boiling range: Undetermined.
- Flash point: Not applicable.
- Flammability (solid, gaseous): Product is not flammable.
- Ignition temperature: Not applicable.
- Decomposition temperature: Not determined.
- Self-igniting: Not determined.
- Danger of explosion: Product does not present an explosion hazard.
- Explosion limits:
  - Lower: Not determined.
  - Upper: Not determined.
- Vapour pressure: Not applicable.
- Density: Not determined.
Safety data sheet
according to 1907/2006/EC, Article 31

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- Relative density  Not determined.
- Vapour density  Not applicable.
- Evaporation rate  Not applicable.

- Solubility in / Miscibility with water:  Soluble.

- Segregation coefficient (n-octanol/water): Not determined.

- Viscosity:
  - Dynamic:  Not applicable.
  - Kinematic:  Not applicable.

- Solvent content:
  - Organic solvents:  0.0 %
  - VOC (EC):  0.00 %
- Other information  No further relevant information available.

10 Stability and reactivity

- Reactivity
- Chemical stability
- Thermal decomposition / conditions to be avoided:
  - No decomposition if used according to specifications.
- Possibility of hazardous reactions  No dangerous reactions known.
- Conditions to avoid  No further relevant information available.
- Incompatible materials:  No further relevant information available.
- Hazardous decomposition products:  No dangerous decomposition products known.

11 Toxicological information

- Information on toxicological effects
- Acute toxicity:
  - Primary irritant effect:
    - On the skin:  No irritant effect.
    - On the eye:  No irritant effect.
- Sensitization:  No sensitizing effects known.
- Additional toxicological information:
  - When used and handled according to specifications, the product does not have any harmful effects to our experience and the information provided to us.
  - The substance is not subject to classification according to the latest version of the EU lists.

12 Ecological information

- Toxicity
- Aquatic toxicity:  No further relevant information available.
- Persistence and degradability  No further relevant information available.
- Behaviour in environmental systems:
  - Bioaccumulative potential  No further relevant information available.
  - Mobility in soil  No further relevant information available.

(Contd. on page 5)
**Trade name:** Ruthenizer 455-PF6

### 13 Disposal considerations

- **Waste treatment methods**
  - **Recommendation** Smaller quantities can be disposed of with household waste.
- **Uncleaned packaging:**
  - **Recommendation:** Disposal must be made according to official regulations.
- **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

### 14 Transport information

<table>
<thead>
<tr>
<th>Mode of Transport</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Land transport ADR/RID (cross-border):</strong></td>
<td>ADR/RID class: -</td>
</tr>
<tr>
<td><strong>Maritime transport IMDG:</strong></td>
<td>IMDG Class: -</td>
</tr>
<tr>
<td></td>
<td>Marine pollutant: No</td>
</tr>
<tr>
<td><strong>Air transport ICAO-TI and IATA-DGR:</strong></td>
<td>ICAO/IATA Class: -</td>
</tr>
</tbody>
</table>

- **UN "Model Regulation":** -
- **Special precautions for user** Not applicable.
- **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.

### 15 Regulatory information

- **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

### 16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- **Abbreviations and acronyms:**
  - ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
  - RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
  - IMDG: International Maritime Code for Dangerous Goods
  - IATA: International Air Transport Association
  - IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
  - ICAO: International Civil Aviation Organization
  - ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
  - GHS: Globally Harmonized System of Classification and Labelling of Chemicals
  - CAS: Chemical Abstracts Service (division of the American Chemical Society)
  - VOC: Volatile Organic Compounds (USA, EU)