

# SP10R-P, SP10RX-P, RP11R-P, RP12R-P, RP13R-P SAFETY DATA SHEET



## 1. Identification

|                          |  |
|--------------------------|--|
| GHS product identifier   | HTP Boron Nitride Nanotube (BNNT) Refined Powder   |
| SDS number               | BNNT - 007   |
| Version No.              | 01   |
| Issue date               | 29-April-2013  |
| Revision date            | 02-October-2020  |
| Supersedes date          | 18-September-2020  |
| CAS No.                  | Mixture  |
| Recommended use          | Property Studies; Compositing; Biomedical; Functionalization; Filters; Thermal conductor   |
| Recommended Restrictions | Not available.   |
| Manufacturer             | <b>BNNT, LLC</b><br>300 Ed Wright Lane Suite A<br>Newport News<br>VA 23606 US<br>info@bnnt.com<br>http://www.bnnt.com<br>Contact Person: R. Roy Whitney<br>+1 757.369.1939 |
| Emergency                |  |

## 2. Hazards identification

|                       |  |
|-----------------------|--|
| GHS classification    |  |
| Physical hazards      | Not classified.  |
| Health hazards        | Acute<br><br>Specific target organ toxicity, single exposure |
| Environmental hazards | Category 3 respiratory tract irritation                      |
| GHS label elements    |  |

Signal word Warning



Hazard statements Causes serious eye irritation. May cause respiratory irritation. May be harmful if swallowed.

### Precautionary statements

|                  |   |
|------------------|---|
| Prevention       | Wear protective gloves/protective clothing/eye protection/face protection. Avoid breathing dust/fume/gas/mist/vapors/spray.   |
| Response         | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. Call a POISON CENTER or doctor/physician if you feel unwell. |
| Disposal         | Dispose of contents/container in accordance with local/regional/national/international regulations.   |
| Specific hazards | Dust may irritate the eyes and the respiratory system. Dust may irritate skin. Research on the dermal exposure of nanomaterials is ongoing.   |

## 3. Composition/information on ingredients

| Components   | CAS No.    | Percent |
|--|------------|---------|
| Boron Nitride; BNNT, LLC (50% BNNT, 50% hexagonal Boron Nitride) | 10043-11-5 | 95-99   |
| Boron  | 7440-42-8  | 1-5     |

|                      |   |
|----------------------|---|
| Composition comments | * Typical value<br>All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. |
|----------------------|---|

## 4. First aid measures

### First aid procedures

|  |   |
|--|---|
| <b>Inhalation</b>  | Dust irritates the respiratory system, and may cause coughing and difficulties in breathing. If symptomatic, move to fresh air. Get medical attention if discomfort develops or persists. |
| <b>Skin</b>  | Contact with dust: Wash area with soap and water. Get medical attention if irritation develops or persists.   |
| <b>Eye</b>   | Dust in the eyes: Do not rub eyes. Immediately flush eye(s) with plenty of water. Remove contact lenses, if present and easy to do. If irritation occurs, get medical assistance.         |
| <b>Ingestion</b>   | Rinse mouth thoroughly if dust is ingested. Get medical attention if symptoms occur.  |
| <b>Most important symptoms and effects, both acute and delayed</b> | Irritation of nose and throat. Irritation of eyes and mucous membranes. Coughing.   |
| <b>Notes to physician</b>  | Provide general supportive measures and treat symptomatically.  |
| <b>General advice</b>  | Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.  |

## 5. Fire-fighting measures

|  |   |
|--|---|
| <b>Suitable extinguishing media</b>                          | Use fire-extinguishing media appropriate for surrounding materials.   |
| <b>Unsuitable extinguishing media</b>                        | None known.   |
| <b>Specific hazards arising from the chemical</b>            | None known.   |
| <b>Protective equipment and precautions for firefighters</b> | Wear a Self-contained breathing apparatus and full protective clothing must in case of fire if necessary. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace. |
| <b>Protection of fire-fighters</b>                           | Use standard firefighting procedures and consider the hazards of other involved materials.  |

## 6. Accidental release measures

|                                  |   |
|----------------------------------|---|
| <b>Personal precautions</b>      | Ensure adequate ventilation. Avoid inhalation of dust and contact with skin and eyes. Wear suitable protective clothing. See Section 8 for personal protective equipment. |
| <b>Environmental precautions</b> | Avoid discharge into drains, water courses or onto the ground.  |
| <b>Methods for containment</b>   | Not available.  |
| <b>Methods for cleaning up</b>   | Avoid dust formation. Collect dust using a vacuum cleaner equipped with HEPA filter.  |

## 7. Handling and storage

|                 |  |
|-----------------|--|
| <b>Handling</b> | Avoid formation of dust and aerosols. Due to their dielectric nature, they are prone to collect charge. Use of static control equipment recommended. |
| <b>Storage</b>  | Store in tightly closed original container in a well-ventilated place. Read and follow manufacturer's recommendations.                               |

## 8. Exposure controls / personal protection

|  |   |
|--|---|
| <b>Occupational exposure limits</b>      | No exposure limits noted for ingredient(s).   |
| <b>Recommended monitoring procedures</b> | Follow standard monitoring procedures.  |
| <b>Engineering controls</b>              | Handle inside a chemical hood when possible.  |
| <b>Personal protective equipment</b>     |   |
| <b>Eye/face protection</b>               | Wear dust-resistant safety goggles where there is danger of eye contact.                          |
| <b>Skin protection</b>                   | Wear suitable protective clothing such as a lab coat.   |
| <b>Respiratory protection</b>            | When handling outside of a fume hood use a non-powered respirator with suitable particle filters. |
| <b>Hand protection</b>                   | Wear protective gloves when handling. Use proper glove removal technique to avoid contact.        |

## 9. Physical and chemical properties

|                       |                      |
|-----------------------|----------------------|
| <b>Appearance</b>     |                      |
| <b>Physical state</b> | Solid.               |
| <b>Color</b>          | White to light grey. |

|   |  |
|---|--|
| <b>Form</b>                                       | Powder, consisting of micron scale agglomerates of HTP BNNTs (dimensions of 2 to 8 nm in diameter and lengths from 1 micron to 1 millimeter) and h-BN nanoparticles (dimensions of 5 to 100 nm). |
| <b>Odor</b>                                       | Not applicable.  |
| <b>pH</b>   | Not applicable.  |
| <b>Melting point/freezing point</b>               | 2973 °C (5383.4 °F)  |
| <b>Boiling point</b>                              | Not applicable.  |
| <b>Flash point</b>                                | Not applicable.  |
| <b>Evaporation rate</b>                           | Not applicable.  |
| <b>Flammability (solid, gas)</b>                  | Not available.   |
| <b>Flammability limit - lower (%) temperature</b> | Not applicable.  |
| <b>Flammability limit - upper (%) temperature</b> | Not applicable   |
| <b>Vapor pressure</b>                             | Not applicable.  |
| <b>Vapor density</b>                              | Not applicable.  |
| <b>Relative density</b>                           | Specific gravity = .01-0.1   |
| <b>Solubility (H2O)</b>                           | Insoluble in water.  |
| <b>Partition coefficient (n-octanol/water)</b>    | Not applicable.  |
| <b>Auto-ignition temperature</b>                  | Not applicable.  |
| <b>Decomposition temperature</b>                  | > 4000 °C (> 7232 °F)  |
| <b>Viscosity</b>                                  | Not applicable.  |
| <b>VOC (Weight %)</b>                             | Not applicable.  |
| <b>Bulk density</b>                               | Variable depending on if compacted (UNIT)  |

## 10. Stability and reactivity

|   |  |
|---|--|
| <b>Chemical stability</b>                 | Stable at normal conditions.               |
| <b>Possibility of hazardous reactions</b> | Will not occur.                            |
| <b>Conditions to avoid</b>                | Avoid dispersion of the powder in the air. |
| <b>Incompatible materials</b>             | None known.                                |
| <b>Hazardous decomposition products</b>   | Boron oxides. Nitrogen compounds.          |

## 11. Toxicological information

|                                      |  |
|--------------------------------------|--|
| <b>Toxicological information</b>     | Occupational exposure to the substance or mixture may cause adverse effects. |
| <b>Acute toxicity</b>                | May cause respiratory tract irritation.                                      |
| <b>Skin corrosion/irritation</b>     | No data available  |
| <b>Serious eye damage/irritation</b> | No data available.   |
| <b>Respiratory sensitizer</b>        | No data available.   |
| <b>Skin sensitization</b>            | No data available.   |

|   |  |
|---|--|
| <b>Mutagenicity</b>                                       | No data available.   |
| <b>Carcinogenicity</b>                                    | No data available.   |
| <b>Reproductive toxicity</b>                              | No data available.   |
| <b>Specific target organ toxicity - single exposure</b>   | May cause respiratory irritation.  |
| <b>Specific target organ toxicity - repeated exposure</b> | No data available.   |
| <b>Aspiration hazard</b>                                  | No data available.   |
| <b>Other information</b>                                  | Large doses of processed HTP BNNT administered to mice via aspiration have been shown to produce acute irritation in the lung tissue. Irritation peaked at 7 days and resolved over time without the development of disease, such as fibrosis. |

## 12. Ecological information

|                                      |  |
|--------------------------------------|--|
| <b>Ecotoxicity</b>                   | The product is not classified as environmentally hazardous. However, as the HTP BNNT component is a nanomaterial, use of Hazardous Materials Remediation companies are recommended for waste management, and this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment. |
| <b>Persistence and degradability</b> | No data available.   |
| <b>Bioaccumulation</b>               | No data available.   |
| <b>Mobility</b>                      | The product is insoluble in water and will sediment in water systems.  |
| <b>Other adverse effects</b>         | No data available.   |

## 13. Disposal considerations

|  |   |
|--|---|
| <b>Disposal methods</b>                      | Avoid discharge into water courses or onto the ground. Dispose in accordance with all applicable regulations.                                   |
| <b>Waste from residues / unused products</b> | Dispose of waste and residues in accordance with local authority requirements.  |
| <b>Contaminated packaging</b>                | Dispose of in accordance with local regulations. Empty containers should be taken to an approved waste handling site for recycling or disposal. |

## 14. Transport information

### ADR

The product is not covered by international regulation on the transport of dangerous goods.

### IATA

The product is not covered by international regulation on the transport of dangerous goods.

### IMDG

The product is not covered by international regulation on the transport of dangerous goods.

### RID

The product is not covered by international regulation on the transport of dangerous goods.

**Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** No information available.

## 15. Regulatory information

**Regulatory information** The product has been classified according to the legislation in force.

### Inventory status

| Country(s) or region | Inventory name   | On inventory (yes/no)* |
|----------------------|--|------------------------|
| Australia            | Australian Inventory of Chemical Substances (AICS)                     | Yes                    |
| Canada               | Domestic Substances List (DSL)   | Yes                    |
| Canada               | Non-Domestic Substances List (NDSL)                                    | No                     |
| China                | Inventory of Existing Chemical Substances in China (IECSC)             | Yes                    |
| Europe               | European Inventory of Existing Commercial Chemical Substances (EINECS) | Yes                    |
| Europe               | European List of Notified Chemical Substances (ELINCS)                 | No                     |
| Japan                | Inventory of Existing and New Chemical Substances (ENCS)               | Yes                    |

| Country(s) or region        | Inventory name  | On inventory (yes/no)* |
|-----------------------------|---|------------------------|
| Korea                       | Existing Chemicals List (ECL)                                     | Yes                    |
| New Zealand                 | New Zealand Inventory   | Yes                    |
| Philippines                 | Philippine Inventory of Chemicals and Chemical Substances (PICCS) | Yes                    |
| United States & Puerto Rico | Toxic Substances Control Act (TSCA) Inventory                     | Yes                    |

\*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

## 16. Other information

### Disclaimer

The information in this SDS was obtained from sources which we believe are reliable, but no warranty or representation as to its accuracy or completeness is hereby given. Users should consider the information herein only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal, the safety and health of employees and customers and the protection of the environment.

### List of abbreviations

Not available.