

SAFETY DATA SHEET

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product Form : Colloidal Suspension

Product Name : Nanocrystalline diamond suspension in dimethyl sulfoxide (DMSO) CAS No. :
7782-40-3

Chemical Formula : C

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company: Adámas Nanotechnologies
8100 - 120 Brownleigh Drive Raleigh,
NC 27617 – 7300
Tel: 919-618-4515

1.4 Emergency contact

Tel: 919-618-4515

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 4), H227

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram: none

Signal word: Warning

Hazard statement(s):

H227 Combustible liquid.

Precautionary statement(s):

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking. P280 Wear protective gloves/
protective clothing/ eye protection/ face protection.

P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

P403 + P235 Store in a well-ventilated place. Keep cool.

P501 Dispose of contents/ container to an approved waste disposal plant.

Product ID: ND-DMSO, Opalseeds, Bluseeds, Greyseeds Page 1 of 7

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

None

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms: DMSO

Molecular Weight: 78.13 g/mol

CAS No.: 67-68-5

EC No.: 200-664-3

Registration Number: 01-2119431362-50-XXXX

Hazardous Components

Component	Classification	Concentration
Dimethyl Sulfoxide		
	Flam. Liq. 4; H227	>= 99

3.2 Mixtures

Name	Product Identifier	Composition	GHS-US Classification	REACH Registration number	Classification according to Regulation (EC) No 1272/2008 [CLP]
Diamond	CAS No.: 7782-40-3	<=1%	Not a hazardous substance or mixture	-	-
Dimethyl Sulfoxide	CAS No.: 67-68-5	>=99%	Flam. Liq. 4; H227	-	Not Classified

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. **In case of**

skin contact

Wash off with soap and plenty of water.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Sulphur Oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

Product ID: ND-DMSO, Opalseeds, Bluseeds, Greyseeds Page 2 of 7

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid breathing vapours, mist or gas. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. **6.3**

Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet- brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the buildup of electrostatic charge. For precautions see section 2.2. **7.2**

Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Store under inert gas. Hygroscopic **7.3**

Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Dimethyl Sulfoxide	67-68-5	TWA	250.000000 ppm	USA Workplace Environmental Exposure Levels (WEEL)

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.2 mm

Break through time: 38 min

Material tested: Dermatriil® P (KCL 743 / Aldrich Z677388, Size M) data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier

of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated

Product ID: ND-DMSO, Opalseeds, Bluseeds, Greyseeds Page 3 of 7

use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. **Respiratory protection**

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. **SECTION 9.**

PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- a) Appearance/Form : Dark amber liquid suspension b) Odour : No data available
- c) Odour Threshold : No data available
- d) pH : No data available
- e) Melting point/freezing point : 16-19°C (61-66°F)
- f) Initial boiling point and boiling range : 189°C (372°F)
- g) Flash point : 87°C (189°F) – closed cup 95°C (203°F) – open cup
- h) Evaporation rate (n-butyl acetate = 1) : 0.026
- i) Flammability (solid, gas) : No data available
- j) Upper/lower flammability or explosive limits : Upper Explosion Limit: 42% (V) Lower Explosion Limit: 3.5% (V) k) Vapour pressure : 0.55 hPa (0.41 mmHg) at 20°C (68°F) l) Vapour density : 2.7 – (Air = 1.0)
- m) Relative density : 3.5 g/cm³ (Diamond)
1.1 g/cm³ (DMSO)
- n) Water solubility : completely miscible
- o) Partition coefficient (noctanol/water) : log Pow: -2.03
- p) Auto-ignition temperature : 300-302°C (572-575°F)
- q) Decomposition temperature : No data available
- r) Viscosity (at 25°C) : 2.0 Mpa·s (or cP)
- s) Explosive properties : No data available
- t) Oxidizing properties : No data available

9.2 Other safety information

Relative Vapour density : 2.70 – (Air = 1.0)

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Heat, flames and sparks. Prolonged heating above 150°C (302°F) can cause rapid, exothermic decomposition **10.5**

Incompatible materials

Acid chlorides, Phosphorus halides, Strong acids, Strong oxidizing agents, Strong reducing agents **10.6**

Hazardous decomposition products

Sulfur dioxide, formaldehyde, methyl mercaptan, dimethyl sulfide, dimethyl disulfide, and bis (methylthio) methane. In the event of fire: see section 5

Product ID: ND-DMSO, Opalseeds, Bluseeds, Greyseeds Page 4 of 7

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 14,500 mg/kg

LC50 Inhalation - Rat - 4 h - 40250 ppm

LD50 Dermal - Rabbit - > 5,000 mg/kg

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

Mouse

lymphocyte

Cytogenetic analysis

Mouse

lymphocyte

Mutation in mammalian somatic cells.

Rat

Cytogenetic analysis

Mouse

DNA damage

Carcinogenicity

Carcinogenicity - Rat - Oral

Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors.

Carcinogenicity - Mouse - Oral

Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Leukaemia Skin and Appendages:

Other: Tumors.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. **ACGIH:** No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Reproductive toxicity - Rat – Intraperitoneal

Effects on Fertility: Abortion.

Reproductive toxicity - Rat - Intraperitoneal

Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Reproductive toxicity - Rat - Subcutaneous

Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Effects on Fertility: Litter size (e.g., # fetuses per litter; measured before birth).

Reproductive toxicity - Mouse – Oral

Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Specific Developmental Abnormalities: Musculoskeletal system.

Product ID: ND-DMSO, Opalseeds, Bluseeds, Greyseeds Page 5 of 7

Developmental Toxicity - Mouse - Intraperitoneal

Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific

Developmental Abnormalities: Musculoskeletal system.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: PV6210000

Effects due to ingestion may include: Nausea, Fatigue, Headache To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Eyes - Eye disease - Based on Human Evidence

Eyes - Eye disease - Based on Human Evidence

SECTION 12. ECOLOGICAL INFORMATION**12.1 Toxicity****Toxicity to fish**

LC50 - Pimephales promelas (fathead minnow) - 34,000 mg/l - 96 h LC50 -

Oncorhynchus mykiss (rainbow trout) - 35,000 mg/l - 96 h **Toxicity to daphnia and other aquatic invertebrates**

EC50 - Daphnia magna (Water flea) - 24,600 mg/l - 48 h
(OECD Test Guideline 202)

Toxicity to algae

EC50 - Pseudokirchneriella subcapitata (green algae) - 17,000 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability Result: 31 % - According to the results of tests of biodegradability this product is not readily biodegradable. (OECD Test Guideline 301D)

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

Stability in Water: 0.12-1.2hrs. at 30°C

SECTION 13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION**DOT (US)**

NA-Number: 1993 Class: NONE

Packing group: III

Product ID: ND-DMSO, Opalseeds, Bluseeds, Greyseeds Page 6 of 7

Proper shipping name: Combustible liquid, n.o.s. (Dimethyl sulfoxide) (Dimethyl sulfoxide)

Reportable Quantity (RQ):

Poison Inhalation Hazard: No

IMDG

Not dangerous goods

IATA
Not dangerous goods

SECTION 15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313. **Massachusetts**

Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Dimethyl Sulfoxide

CAS-No. 67-68-5

Diamond

CAS-No.: 7782-40-3

Revision Date

2007-03-01

New Jersey Right To Know Components

Dimethyl Sulfoxide

CAS-No. 67-68-5

Diamond

CAS-No.: 7782-40-3

Revision Date

2007-03-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

SECTION 16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Flam. Liq. Flammable liquids

H227 Combustible liquid

HMIS Rating

Health hazard: 1

Chronic Health Hazard:*

Flammability: 2

Physical Hazard 0

NFPA Rating

Health hazard: 0

Fire Hazard: 2

Reactivity Hazard: 0

Disclaimer:

The information contained in this document should only serve as a supplement to other information gathered by users, and they should make independent judgment of suitability of this information to ensure proper use and protect their health and safety. This information is furnished without warranty, and any use of the product not in conformance with this safety data sheet, or in combination with any other product or process, is the responsibility of the user. Copyright 2015 Adamas Nanotechnologies, Inc.