full spectrum cell analysis
eBioscience™

Material Safety Data Sheet

Section 1 - Chemical Product and Company Identification

Product details:	Cadmium Selenide (CdSe) eFluor™ Nanocrystals with Zinc Sulfide coating conjugated to antibodies and proteins. This MSDS covers all CdSe-containing eFluor™ Nanocrystal configurations conjugated to protein.
Trade name:	eFluor™ Nanocrystal
Chemical Family:	Matrix: Water Nanocrystal: IV-VI semiconductor compound
Manufacturer/Supplier:	eBioscience, Inc. 10255 Science Center Drive San Diego, Ca 92121 888-999-1371

Section 2 - Composition / Information on Ingredients

Component	CAS#	EC#	% By Weight
Water	7732-18-5	N/A	96
Cadmium Selenide/Zinc Sulfide (as nanocrystal compound)	1306-24-7	215-148-3	< 0.1
Polymer	proprietary	proprietary	~ 4
or			
Lipid	proprietary	proprietary	~ 4

Section 3 - Hazards Identification

Hazard Description:	Moderately Toxic
NFPA Rating:	Health = 1 Fire = 0 Reactivity = 0

Emergency Overview	
Color:	Yellow-brown
Physical Form:	Liquid
Odor:	None
Major Health Hazards:	None known
Physical Hazards:	None

Potential Health Effects	
Inhalation:	No data available
Skin Contact:	No data available
Eye Contact:	No data available
Ingestion:	No data available

Carcinogen Status	Cadmium Containing Compounds	Selenium Containing Compounds	Zinc Containing Compounds
OSHA:	Yes	No	No
NTP:	Yes	No	No
IARC:	Yes	No	No

Section 4 - First Aid Measures

Inhalation:	If inhaled, remove to fresh air. If not breathing give artificial respiration and seek medical attention.
Skin Contact:	Wash skin with soap and water for at least 15 minutes while removing contaminated personal protective equipment, clothing, and shoes. Seek medical attention if needed.
Eye Contact:	Irrigate eyes for at least 15 minutes. Seek medical attention.
Ingestion:	If ingested, do not induce vomiting, seek medical attention immediately.

Section 5 - Fire Fighting Measures

Extinguishing Media:	Material does not burn.
Fire Fighting:	N/A
Flash Point:	N/A
Flammable Limits:	N/A
Autoignition Point:	N/A
Flammability Class:	N/A

Section 6 - Accidental Release Measures

Small Spills:	Utilize personal protective equipment as described in section 8 and absorb with spill pillow. Collect spilled material in appropriate container for disposal.

Section 7 - Handling and Storage

Utilize good hygienic work practices. Wash hands after use. Store in a tightly closed container. Store in a cool dry place.

Section 8 - Exposure Control / Personal Protection

Exposure Limits	
Cadmium compounds (as Cd)	5 ug/m3 OSHA TWA (metal and compounds) 2.5 ug/m3 OSHA action level (metal and compounds) 0.2 mg/m3 OSHA TWA (dust) (where cadmium standard 1910.1027 is not if effect) 0.6 mg/m3 OSHA ceiling (dust) (where cadmium standard 1910.1027 is not if effect) 0.01 mg/m3 ACGIH TWA (compounds and metal) 0.002 mg/m3 ACGIH TWA (respirable particulate, compounds and metal) 0.015 mg/m3 AGS TRK (inhalable dust fraction) (others) 0.025 mg/m3 UK MEL TWA (metal and compounds)
Selenium compounds (as Se)	0.2 mg/m3 OSHA TWA 0.2 mg/m3 ACGIH TWA 0.2mg/m3 NIOSH recommended TWA 10 hour(s) 0.05 mg/m3 DFG MAK (peak limitation category - II, with excursion factor of 4) (inhalable dust fraction) (metal and inorganic compounds) 0.1 mg(Se)/m3 UK OES TWA
Zinc Sulfide	15 mg/m3 OSHA TWA (particulates not otherwise regulated)
Polymer	Not regulated
Lipid	Not regulated

Ventilation:	No special ventilation requirements needed, unless heated to boiling point then provide local exhaust ventilation system or work in a chemical fume hood. Ensure compliance with applicable exposure limits.
Eye Protection:	Wear safety glasses with side shields as a minimum of protection. If splash or splatter is possible, wear chemical/splash resistant safety goggles and or face shield. Emergency eye wash station and quick drench shower should be provided in the immediate work area as per the ANSI Z358.1 guidelines.
Clothing:	Wear appropriate chemical resistant clothing.
Gloves:	Wear appropriate chemical resistant gloves for type of exposure. Latex, nitrile, or butyl gloves provide adequate protection.
Respirator:	Material in liquid form, no respiratory protection required.

Section 9 - Physical and Chemical Properties

Cadmium Selenide / Zinc Sulfide eFluor™	
Physical State:	Liquid
Color:	Yellow-brown
Odor:	None
Boiling Point:	~212 F° (100 C°)
Freezing Point:	~32 F° (0 C°)
Vapor Pressure:	N/A
Vapor Density (air = 1):	N/A
Specific Gravity (water = 1):	~1.0
pH:	Neutral

Section 10 - Stability and Reactivity

Stability:	Stable at standard temperatures and pressure.
Conditions to avoid:	Avoid freezing.
Incompatible:	Alkali metals.
Hazards Decomposition:	N/A
Polymerization:	Material will not polymerize.

Section 11 - Toxicological Information

Zinc Sulfide	
Toxicity Data:	Oral Rat > 2,000 mg/kg LD50; Inhalation Rat > 5,040 mg/m3 LC50; Skin Rat . 2,000 mg/kg LD50
Acute inhalation, skin and eye toxicity:	Zinc Sulfide is an irritant to the eyes, respiratory system, and skin.

Cadmium Compounds	
Acute Inhalation:	Exposure to sufficiently high concentrations of cadmium dusts my result in upper respiratory tract irritation with delayed symptoms of cough, sore throat, wheezing, headache, chest pain, dizziness, abdominal pain, nausea, diarrhea, and vomiting. Exposure may also cause sweating, chills, and difficulty in breathing. Severe exposures may result in lung, kidney or liver damage or death from massive pulmonary edema.

Cadmium Compounds	
Chronic Inhalation:	Cadmium is highly cumulative and respiratory effects from repeated or prolonged exposure to dusts or fumes may include rhinitis, bronchitis, emphysema, cough, dyspnea, abnormal lung function, obstructive disease, and possibly fibrosis. Ulceration of the nasal septum and yellow discoloration of the teeth may occur. Cadmium induced kidney damage is irreversible and may progress after exposure ceases; some cases of progression to kidney failure have been described. Osteomalacia, osteoporosis, and spontaneous and pseudofractures may occur and may be manifested as back pain, pain in the extremities, difficulty in waling, and pain on bone pressure. Other effects may include irritability, weight loss, fatigue, mild to moderate anemia, eosinophilia, damage to the olfactory nerve with anosmia, and liver damage. An epidemiological study suggests a relationship between cadmium levels in air and cardiovascular disease, but a causal association has not been proved. Occupational exposure to cadmium is implicated in a significant increase in the incidence of prostatic and respiratory cancers.
Acute Ingestion of Cadmium Compounds:	The persistent vomiting induced by cadmium compounds may limit the amount retained, but if sufficient amounts are absorbed, symptoms of systemic toxicity may begin within 15 minutes to 2 hours. Salivation, choking, severe nausea, abdominal pain, diarrhea, tenesmus, blurred vision, dizziness, headache, muscular cramps, exhaustion, collapse, shock, unconsciousness and rarely, convulsions may occur. Recovery may begin within 5-10 hours; sequelae may include delayed liver and kidney damage. Single doses of 10-20 mg of soluble cadmium salts have induced severe toxic effects and doses above 300 mg may be fatal. Death due to shock and dehydration may occur within 24 hours or may be delayed 7-14 days and be due to renal failure or cardiopulmonary depression.
Chronic Ingestion of Cadmium Compounds:	Cadmium accumulates in the body and prolonged low level exposure may cause irreversible renal tubular dysfunction and bone effects as described in the chronic inhalation section.
Moderately Toxic:	Ingestion
Target Organs:	Nervous system

Selenium Compounds	
Acute Inhalation:	May cause irritation and inflammation of the upper respiratory tract, redness of mucous membranes, sneezing, coughing, sore throat, metallic taste in mouth, and gastrointestinal distress. Exposure to high concentrations of fumes may cause dyspnea and possibly slight tracheobronchitis. Central nervous effects may include frontal headaches, nervousness, convulsions, and death from respiratory depression.
Chronic Inhalation:	Repeated or prolonged exposure may result in metallic taste in mouth followed by a garlic odor of the breath and sweat. Other symptoms may include pallor, coated tongue, gastrointestinal disturbances including nausea, vomiting, abdominal pain, diarrhea, weight loss, lumber pain, depression, lassitude, fatigue, giddiness, and emotional instability. Liver and spleen effects and albuminuria, porphyrinuria, and urobilinuria have also reported.

Selenium Compounds	
Chronic Skin Exposure:	Repeated or prolonged exposure to light dust concentrations of selenium compounds may cause dermatitis, paronychia, and skin eruptions. Some selenium compounds are absorbed through the skin and may result in effects as detailed in the inhalation section.
Acute Ingestion:	Ingestion may cause severe irritation and disturbances of the gastrointestinal tract, metallic taste in mouth, tachycardia, chills, and central nervous system effects as detailed in acute inhalation.
Chronic Ingestion:	Repeated or prolonged ingestion may result in a metallic taste in mouth, garlic odor of breath and sweat, and other symptoms as described in chronic inhalation. Additional effects reported from ingestion of food and water containing excessive amounts of selenium include skin hyperpigmentation, nail changes, gingivitis, excess dental caries, malocclusion, weight loss, vestibulotoxicity, amyotrophic lateral sclerosis, arthritis, problems walking, diminished reflexes, substernal pain, disturbances of respiratory and endocrine function, jaundice, hepatic disease, and socio-physiologic effects. In extreme cases, loss of nails and hair, numbness and incoordination of arms and legs, paralysis, lack of mental alertness and death from respiratory paralysis may occur.
Additional toxicological information:	To the best of our knowledge the acute and chronic toxicity of this substance is not fully known. Cadmium Selenide, in the form of a nanocrystal may or may not present the same health hazards as larger cadmium or selenium containing molecules. It is therefore encouraged to use caution when handling this product as its toxicity and modes of exposure are not well characterized or understood.

Polymer	
	No data available.

Lipid	
	No data available.

Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this eFluor™ material is not fully known. Cadmium compounds, in the form of a nanocrystal may or may not present the same health hazards as a larger cadmium containing molecules. It is therefore encouraged to use caution when handling this product even though the concentration of cadmium is very low, its toxicity and modes of exposure are not well characterized or understood.

Section 12 - Ecological Information

Do not allow material to be released to the environment (ground, air or water bodies) without proper permits.

Section 13 - Disposal Considerations

Dispose in accordance with all applicable local, state, and federal regulations. Considered dangerous to the environment. U.S. EPA 40 CFR 262: Hazardous Waste Number: D006 (cadmium), D010 (selenium)

Section 14 - Transport Information

US.DOT:	Not regulated
Canadian Transportation of Dangerous Goods:	Not regulated
Land Transport ADR/RID	Not regulated
Air Transport IATA/ICAO	Not regulated

Section 15 - Regulatory Information

US Regulations	CERCLA: No SARA Title III, sec. 302, 304: No SARA Title III, Section 311/312 Acute: No Chronic: Yes Fire: No Reactive: No Sudden Release: No US Inventory (TSCA) listed: Yes
Canadian Regulations	WHMIS Classification: Not available
European Regulations	Xn, N
EC Risk Phrases	R22, R45, R51, S2, S60, S61

Section 16 - Other Information

Information given herein is offered in good faith as accurate, but without guarantee. Conditions of use and suitability of the product for particular uses are beyond our control: all risks of use of the product are therefore assumed by the user.

Preparation Date: 09/19/2008