

MATERIAL SAFETY DATA SHEET

Product: Adhesion Promoters
Trade Name: ZAP1010, ZAP1020
Supplier: Zen Photonics Co., Ltd.

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1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

Emergency phone numbers: +82-42-869-0302

Product : Adhesion Promoter ZAP1010, ZAP1020

Trade Name : ZAP1010, ZAP1020

Effective Date : 07/01/2002 Date Printed : 07/15/2002

Zen Photonics Co., Ltd., 104-11 Moonji-dong, Yusong-gu, Daejeon 305-380,
South Korea

2. COMPOSITION INFORMATION ON INGREDIENTS

1-Methoxy-2-propanol	CAS# 000107-98-2	>95 % min.
Proprietary Ingredient		<5 % Max.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Clear, colorless liquid. Slight ether odor. Flammable. Vapors may travel a long distance; ignition may occur.

POTENTIAL HEALTH EFFECTS

EYE : May cause slight transient eye irritation. Corneal injury is unlikely.

SKIN : Prolonged or repeated exposure may cause skin irritation. Prolonged skin contact with very large amounts may cause drowsiness.

INGESTION : Single dose oral toxicity is considered to be extremely low. Small amounts swallowed incidental to normal handling operations are not likely to cause injury; swallowing amounts larger than that may cause injury.

INHALATION : The odor is objectionable at 100 ppm; higher levels produce eye, nose, and throat irritation and are intolerable at 1000 ppm. Anesthetic effects are seen at or above 1000 ppm.

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SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Observations in animals include liver and kidney effect. Signs and symptoms of excessive exposure may be anesthetic or narcotic effects.

TERATOLOGY (BIRTH DEFECTS): Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus.

4. FIRST AID

EYES : Irrigate with flowing water immediately and continuously for 15 minutes.

SKIN : Immediately remove contaminated clothing. Wash off in flowing water or shower.

INGESTION : Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

INHALATION : Remove to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

NOTE TO PHYSICIAN : Treatment based on judgment of the physician in response to reactions of the patient.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT : 32 °C (90 °F)

AUTOIGNITION TEMPERATURE : 287 °C (549 °F)

FLAMMABILITY LIMITS

LFL : 1.5 vol % @ 151 °C

UFL : 10.9 vol % @ 151 °C

***Based on 1-Methoxy-2-propanol**

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HAZARDOUS COMBUSTION PRODUCTS : During a fire, smoke may contain the original material in addition to unidentified toxic and/or irritating compounds. Hazardous compounds may include and are not limited to : carbon monoxide, carbon dioxide.

OTHER FLAMMABILITY INFORMATION : Violent steam generation or eruption may occur upon application or direct water stream. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Vapors can form flammable mixtures if slightly heated. Surfaces that are sufficiently hot may ignite liquid product in the absence of sparks or flame. Remove all possible ignition sources; like cigarettes, flames, pilot lights, electric sources, etc.

EXTINGUISHING MEDIA : Water fog or fine spray, carbon dioxide, dry chemical, foam. Do not use direct water stream. Straight or direct water steams may not be effective to extinguish fire.

MEDIA TO BE AVOIDED : Do not use direct water stream.

FIRE FIGHTING INSTRUCTIONS : Keep people away. Isolate fire area and deny unnecessary entry. Eliminate ignition sources. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Do not use direct water stream. May spread fire. Water may be effective in extinguishing fire. Move container from fire area if this is possible without hazard.

PROTECTIVE EQUIPMENT FOR FIREFIGHTERS : Wear positive-pressure self-contained breathing apparatus and protective clothing (includes fire fighting helmet, coat, pants, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

6. ACCIDENTAL RESEASE MEASURES

PROTECT PEOPLE : Keep unnecessary people away; isolate hazard area and deny unnecessary entry. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion.

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PROTECT THE ENVIRONMENT : Vapor explosion hazard, keep out of sewers.

CLEANUP : Use inert absorbent material such as sand or sawdust. Under some conditions of use, application of clay or cellulose based absorbents on spills of this material may result in the generation of flammable vapors since there is a heat of absorption and a high surface area. Pump up (with appropriate explosion-proof equipment) or soak up with sand or other absorbent. Application of vapor suppression forms may be appropriate. Ventilate area and wash spill site after material pick up is complete.

7. HANDLING AND STORAGE

HANDLING : Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld or perform similar operations on or near empty containers. No smoking, open flames or sources of ignition in handling and storage area.

STORAGE : Use of non-sparking or explosion proof equipment may be necessary, depending upon the type of operation. Minimize source of ignition, such as static buildup, heat, spark or flame. Keep containers tightly closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS : Provide general and/or local exhaust ventilation to control airborne levels below the exposure guideline. Use only with adequate ventilation.

PERSONAL PROTECTIVE EQUIPMENT

EYE/FACE PROTECTION : Use chemical goggles.

SKIN PROTECTION : When prolonged or frequently repeated contact could occur, use protective clothing impervious to this material. Selection of specific items such as face-shield, gloves, boots, apron, or full-body suit will depend on operation.

RESPIRATORY PROTECTION : Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required, use an approved air-

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purifying or positive-pressure supplied-air respirator depending on potential airborne concentration. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. In confined or poorly ventilated area, use an approved positive-pressure supplied-air respirator.

EXPOSURE GUIDELING : Propylene glycol monomethyl ether: ACGIH Threshold Limit Value (TLV) and OSHA Permissible Exposure Limit (PEL) are 100 ppm and 150 ppm, respectively.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE : Clear, colorless liquid

ODOR : slight ether odor; objectionable @100ppm or higher.

VAPOR PRESSURE : 12.5 mm Hg @ 25 °C

VAPOR DENSITY : 3.12 (Air = 1)

BOILING POINT : 120 °C (248.3 °F)

SOLUBILITY IN WATER : Infinitely.

SPECIFIC GRAVITY : 0.919 @ 25 °C

*Based on 1-Methoxy-2-propanol.

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY : Stable under recommended storage conditions.

CONDITIONS TO AVOID : Avoid heat and ignition source. Flammable vapors can be released at elevated temperatures.

INCOMPATIBILITY WITH OTHER MATERIALS : Strong oxidizing agent.

HAZARDOUS DECOMPOSITION PRODUCT : Refer to Section 5 for Hazardous Combustion Products.

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HAZARDOUS POLYMERIZATION : will not occur.

11. TOXICOLOGICAL INFORMATION

(See Section 3 for Hazard Identification)

SKIN : The LD50 for skin absorption in rabbits is approximately 12ml/kg

INGESTION : The oral LD50 for rate is 6.6 ml/kg.

MUTAGENICITY : In vitro mutagenicity studies were negative.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE

MOVEMENT & PARTITIONING : Bioconcentration potential is low (The bioconcentration factor (BCF) less than 100 or Log Pow less than 3).

DEGRADATION & TRANSFORMATION : Biodegradation under aerobic static laboratory conditions is high(BOD20 or BOD28/ThOD greater than 40%).

ECOTOXICTY : Material is practically non-toxic to aquatic organisms on an acute basis (LC50 greater than 100 mg/L in most sensitive species).

13. DISPOSAL CONSIDERATIONS

DISPOSAL : Do not dump into any sewers, on the ground, or into any body of water. All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. The Zen Photonics Co., LTD. has no control over the management practices or manufacturing processes of parties or using this material. The information presented here pertains only to the product as shipped in its intended condition as described in MSDS Section 2.

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FOR UNUSED & UNCONTAMINATED PRODUCT : The preferred options include sending to a licensed, permitted : recycler, reclaimer, incinerator or other thermal destruction device.

14. TRANSPORT INFORMATION

For U.S. Department of Transportation (DOT) regulatory information, if required, consult transportation regulations or product shipping papers.

15. REGULATORY INFORMATION

Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. See other sections for health and safety information.