MMAO-3A / Toluene Solutions

(Modified Methylaluminoxane, type 3A[a])

Product description

Approx. molecular formula	:	$[(CH_3)_{0.7}(isoC_4H_9)_{0.3}AlO]_n$
Approx. molecular weight	:	70.7
CAS No.	:	146905-79-5
EINECS/ELINCS No.	:	regarded as 'polymeric substance' [b]
TSCA status	:	listed on inventory

Characteristics[c]

Appearance	:	clear, colorless to slightly hazy liquid
Density, 30°C	:	0.906 g/ml
Freezing point	:	< -40°C
Viscosity, 30°C	:	1.4 mPa.s
Stability to air	:	may ignite upon exposure
Stability to water		reacts violently
Solubility	:	soluble in aromatic saturated aliphatic hydrocarbons

Composition[c]

Component	*Specification (molar%)*	*Typical (molar%)*
Methane[d]	62.0 min.	69
Isobutane[d]	38.0 max.	29
Hydrogen[d]	3.0 max.	1.5
Others[d]	3.0 max.	0.5
	(wt%)	*(wt%)*
Aluminum[e]	6.0-8.0	7.1
Active Al[f]	25-35	29

Availability

MMAO-3A in toluene is a commercial product. The product is not available neat. Consult your Akzo Nobel sales manager for further information.

Storage

MMAO-3A in toluene is stable when stored under a dry, inert atmosphere and away from heat. MMAO-3A in toluene is significantly more stable to long-term storage than solutions of conventional polymethylaluminoxane, but prolonged storage at 30°C or higher may result in slight solids/gel formation.

Packaging

Toluene solutions of MMAO-3A are available worldwide in cylinders and portable tanks. In North America only, MMAO-3A in toluene is also available in tank trailers and rail cars. Containers are fabricated from carbon steel and are equipped with dip tubes for top discharge and all connections are located in the vapor space.

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[a] For more information on aluminoxanes, see the Akzo Nobel technical bulletin entitled *Properties of Aluminoxanes from Akzo Nobel*.
[b] Polymeric substances do not require EINECS/ELINCS notification.
[c] Data for toluene solution containing 7% aluminum; this corresponds to an MMAO-3A concentration of about 18%.
[d] Calculated from gas chromatographic analysis of hydrocarbons and hydrogen obtained by hydrolysis.
[e] Determined by titration of aqueous hydrolyzate.
[f] Determined by the pyride titration method.

Safety & handling

Toluene solutions of MMAO-3A may ignite upon exposure to air and react violently with water. Toluene solutions of MMAO-3A must be handled under a dry, inert atmosphere, e.g. nitrogen or argon. Water must be scrupulously removed from process equipment prior to putting it into metal alkyls service. Failure to do so may result in an explosion. Products of complete combustion of toluene solutions of MMAO-3A are aluminum oxide, carbon dioxide and water. Toluene solutions of MMAO-3A cause severe burns to the skin and eyes. Inhalation of toluene may lead to weakness, confusion, impaired coordination and even death. It is imperative that proper personal protective equipment be worn when handling toluene solutions of MMAO-3A.

Please refer to the Material Safety Data Sheet (MSDS) for further information on the safe storage, use and handling of toluene solution of MMAO-3A. This information should be thoroughly reviewed prior to acceptance of this product. The MSDS is available at the Akzo Nobel Polymer Chemicals website.

Applications

Toluene solutions of MMAO-3A are used as cocatalysts in polymerization of olefins and other monomers via single-site catalysts.

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