

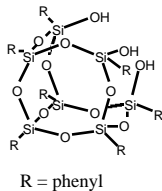
Nanostructured® POSS® Cure Promoters and Accelerators

Product Descriptions

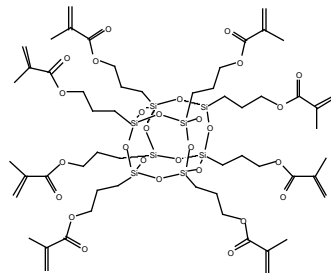
POSS® Trisilanol SO1458 is a highly soluble, fire retardant and stable trisilanol Nanostructured® Chemical that can serve as a cure promoter for amine cured epoxy resins and bismaleimides. **SO1458** can be employed as an additive in unfilled or filled resin systems to which a curative is then added. **SO1458** can significantly reduce both cure time and temperature required to obtain optimal network formation.

POSS® Polyepoxy EP0408 is an optically transparent, fire retardant, highly soluble, polyepoxy functionalized Nanostructured® Chemical that can serve as a cure accelerator for amine or anhydride cured epoxy resins. **EP0408** can be employed as an additive in unfilled or filled resin systems to which a curative is then added. **EP0408** can significantly reduce both cure time and required to obtain network gelation.

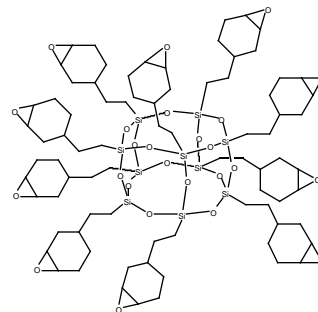
POSS® Polymethacryl MA0735 is an optically transparent, fire retardant, highly soluble, polyepoxy functionalized Nanostructured® Chemical that can serve as a cure accelerator for amine or anhydride cured epoxy resins. **MA0735** can be employed as an additive in unfilled or filled resin systems to which a curative is then added. **MA0735** can significantly reduce both cure time and required to obtain network gelation.



POSS Silanol SO1458



POSS Methacrylate MA0735



POSS Polyepoxy EP0408

Key Performance Properties

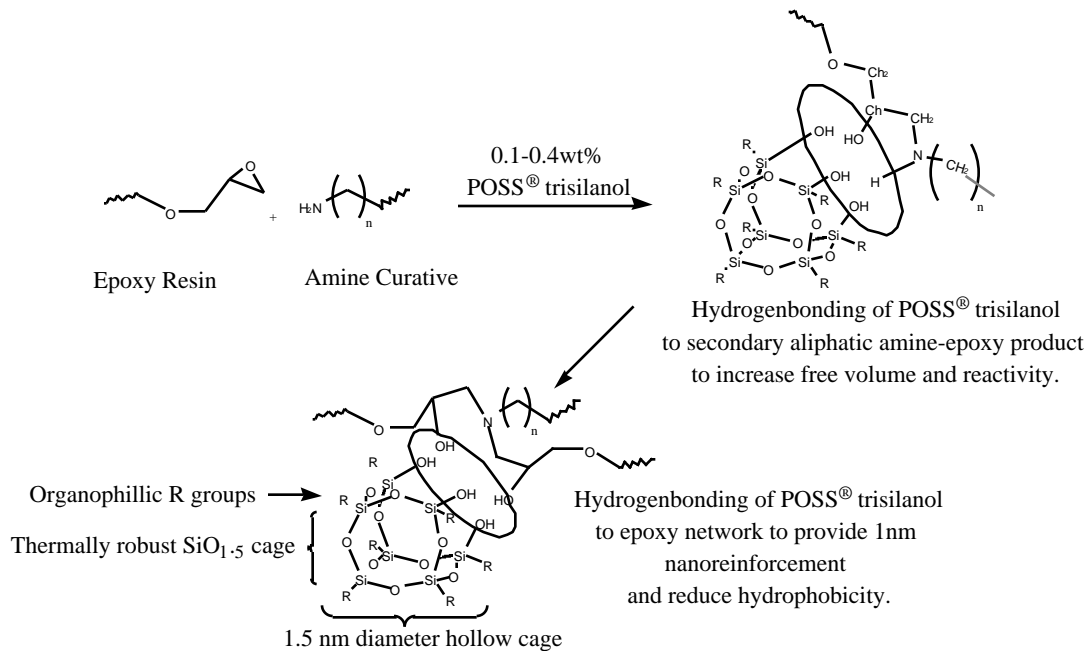
- *Reduced Cure Time*
- *Reduced Viscosity*
- *Improved Flame Retardancy*
- *Optically Transparent*
- *Reduced Cure Temperature*
- *Improved Hydrophobicity*
- *Increased Thermal Usage Range*
- *Reduction of VOC*

Suggested Applications

- Composites, Encapsulants, Coatings, Adhesives

Mechanisms

Cure Promotion by SO1458 has been described by Lee and coworkers at Michigan State University. The mechanism is attributed to the ability of SO1458 to form a complex with partially reacted epoxy resin. The nanoscopic size of SO1458 increases the free volume and reactivity of the secondary amine proton thus enabling it to react with a second epoxy group and effectively complete network formation at reduced temperatures.



Cure acceleration by EP0408 and MA0735 is attributed to high degree of functionality at the corners of the POSS[®] cage. The ability of EP0408 and MA0735 to readily dissolve at the 1nm level into resins or comonomers allows it to effectively form networks under cured conditions.

Composition, Thermomechanical, and Processing Parameter Comparisons

SO1458	Epoxy	Amine	Cure Temp (°C)	Cure Time (h)	Tg (°C)	E' @ 30°C (GPa)	E' @ Plateau (MPa)
0	DGEBA	Jeffamine [®]	100	12	84	3.7	30
0.4	DGEBA	Jeffamine [®]	100	12	91	3.3	32
0	TGDDM	Jeffamine [®]	150	12	137	4.3	80
0.4	TGDDM	Jeffamine [®]	150	12	148	3.6	76
0	DGEBA	Dytek [®] A	100	12	98	2.6	29
0.2	DGEBA	Dytek [®] A	100	12	115	2.6	36
0.6	TGDDM	Dytek [®] A	100	12	118	2.3	38
0.8	TGDDM	Dytek [®] A	100	12	122	2.0	36
0	TGDDM	Dytek [®] A	150	12	167	2.6	78
0.2	TGDDM	Dytek [®] A	150	12	214	2.5	97
0.6	TGDDM	Dytek [®] A	150	12	219	2.8	125
0	TGDDM	Dytek [®] A	100	24	198	2.5	126
0.4	TGDDM	Dytek [®] A	100	24	207	3.0	144
1.0	TGDDM	Dytek [®] A	100	24	222	2.5	172

Jeffamine[®] Huntsman Chemicals, Dytek[®] A DuPont

Sales/Technical Service

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