

Hybrid Plastics®

Superior Technology for Superior Products

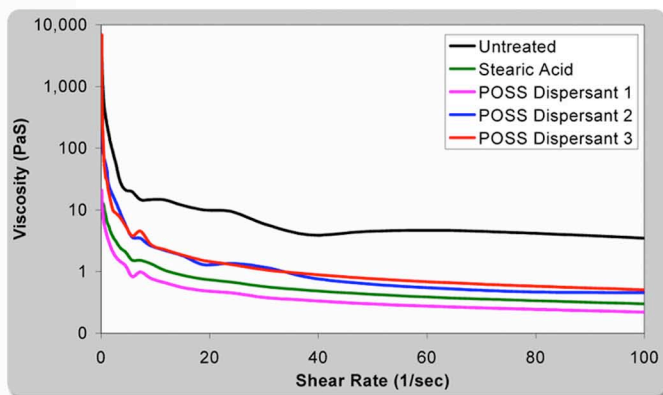
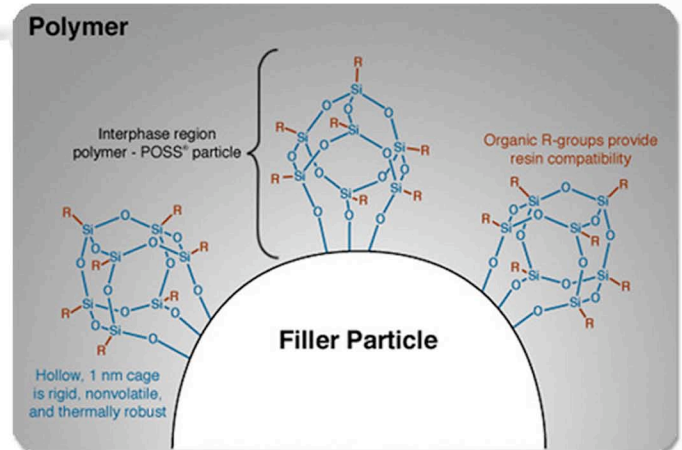
POSS® Universal Dispersants

Hybrid Plastics® offers the next generation of *universal* dispersion aids based on POSS® Technology. POSS® dispersants offer several advantages over traditional dispersants and coupling agents, including:

- Thermal stability up to 400 °C
- Nanoscopic monolayer coverage
- Dominates surface area - 3600 m²/g
- No VOC's generated
- Stronger bonding—sticks at high temperatures
- Works in thermoplastics and thermoset materials

ANATOMY OF POSS® DISPERSANTS

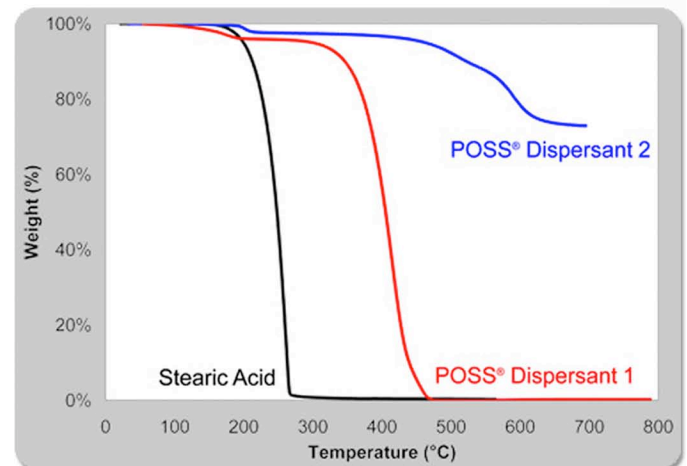
POSS® dispersants consist of an inner cubic silica surrounded by organic groups for compatibility and silanol groups for binding. The organic group is matched with the system to maximize compatibility. Silanol groups can bind to just about any filler. Because there are multiple silanol groups per molecule, a strong, thermally stable bond is formed.



Rheology curves of a highly filled system utilizing POSS® and commercial dispersants

LOWER VISCOSITY / HIGHER FILLER LOADING

POSS® dispersants can be used in highly filled resins to decrease viscosity. POSS® strongly bonds to the surface of fillers and breaks up particle-particle interactions. This effect not only increases productivity, but also improves mechanical properties and surface finish. In addition, due to the viscosity reduction, more filler can be added to the resin while maintaining the desired viscosity. In one example, three times as much titanium dioxide was able to be used.



Thermal Gravimetric Analysis of selected POSS® Dispersants

SUPERIOR THERMAL STABILITY

One of the biggest advantages of POSS® dispersants is their exceptional thermal stability. The thermogravimetric analysis chart compares two different POSS® dispersants with a popular commercial dispersant, stearic acid. Stearic acid degrades / evaporates at about 200°C, while POSS® dispersants can be stable up to 400 °C. This superior stability lends to POSS's use in high temperature polymers such as PEEK, polyimide and polysulfones.

AVAILABILITY & EASE OF USE

POSS® dispersants work with nearly every filler, and have been used successfully to treat TiO₂, CaCO₃, BN, MnO₂, mica, silica and glass fiber. POSS® dispersants are easy to use, safe to handle and do not contain or generate any volatile organic compounds. In most cases they can simply be added to the formulation with no additional steps taken. They are available in pure form at R&D and bulk quantities. They are also available in custom form, such as thermoplastic masterbatch or predispersed in a thermoset resin, upon request.