POSS® as Novel additives for Cosmeceuticals

Dr. Chris DeArmitt FRSC
Chief Scientist
Overview

• What is POSS®?
• Safety of POSS®
• Improved healing
• UV blocking POMS
• New emulsifiers and surfactants
• POSS® antioxidants
• New moisture trapping agents
• Conclusions
Why Hybrid Materials?

POSS® is a unique hybrid organic-inorganic composition.

- **Chemical and Oxidative Stability**
  - Ceramics
  - Hybrid Properties
  - Organics

- **Biological Compatibility and Ease of Flow**
What does POSS® look like?

Crystalline Solids
Wide melting range 24°C to 400°C

Liquids/Oils
Wide viscosity range 1000cP to 100000cP

Waxes
Each “black dot” represents a 1.5nm POSS®

*scale of bar = 50nm

Viers - US Air Force Research Laboratory
Several of the larger production volume POSS® types are TSCA listed

**Octaisobutyl POSS® MS0825**
US Category IV Oral LD50 > 5000 mg/kg

**Octamethyl POSS® MS0830**
EU Oral LD50 > 2000 mg/kg

**Dodecaphenyl POSS® MS0802**
EU Oral LD50 > 2000 mg/kg

*Does not require the risk phrase R22 "Harmful if Swallowed."

Tested on rats by independent accredited laboratory
### Elements Incorporated into POSS®

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“With POSS®, I found three times the number of blood platelets”.

“POSS® stimulates differentiation of osteoblasts”.

“After 4 weeks, spongy bone was completely replaced by compact bone”.

“We can apply this in many fields, such as bone fracture, plastic surgery, dentistry, dental implants, extraction and so on”.

"Skin Regeneration Using Nanotechnology

"Evaluation of Bone Regeneration Utilizing POSS®

Dr. Toshihiko Inage, Nihon University

Advanced Materials Symposium, 2007
UV Blocking POMS

0.045 wt.% POSS in THF

Hybrid Plastics™
POSS® Dispersants

- Three silanols chelate to give strong bonds to the surface
- POSS® cages derivatized to give optimal compatibility with and dispersion in the matrix oil or polymer
- Very effective with TiO₂ and other pigments
POSS® Passivating Agent for Copper

SO1455

SO1450
POSS® Passivating Agent for Copper

Heat Flow (W/g)

Irganox 1010
Copper pan

+ 0.2%
MS0805
SO1450
SO1455

Irganox 1010
Aluminium pan

+ 0.2%

In hydrocarbon oil (squalane) 190°C, oxygen atmosphere
POSS® Antioxidants
Animation of PEG POSS® Humectant
Summary

• POSS® provides you with innovative tools for the creation of superior products

• Unique, exclusive additives provide for product differentiation in the marketplace

• Hybrid Plastics supports customers with technical expertise

• Custom synthesis of new actives available
Thank you!

Thanks to: Joe Lichtenhan, Paul Wheeler, Bruce Fu