



# **POSS<sup>®</sup> as Novel additives for Cosmeceuticals**

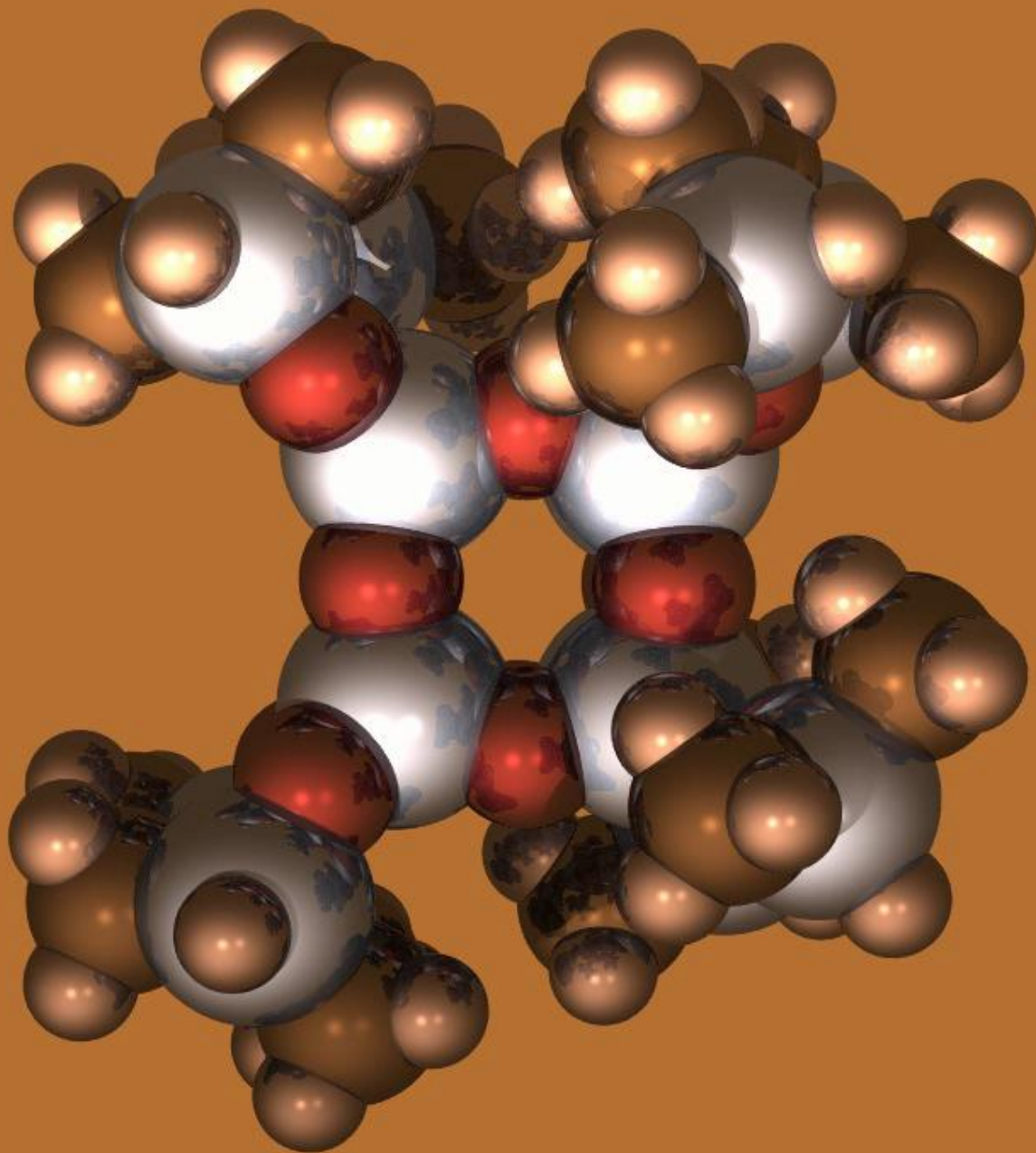
**Dr. Chris DeArmitt FRSC**  
**Chief Scientist**

**Hybrid**  
**Plastics™**

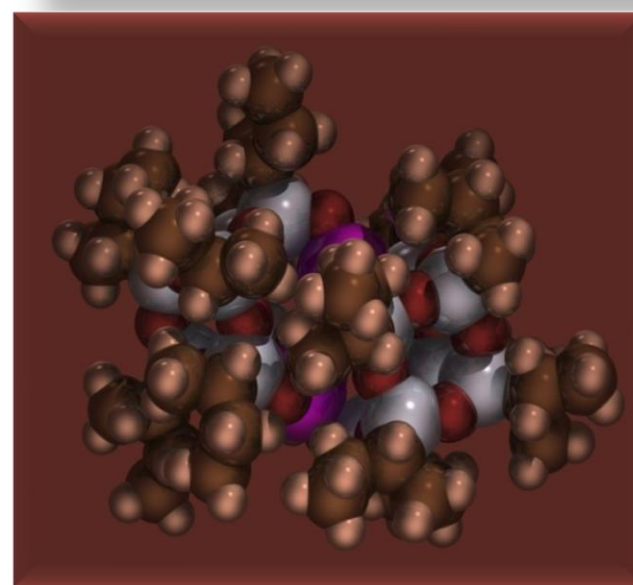
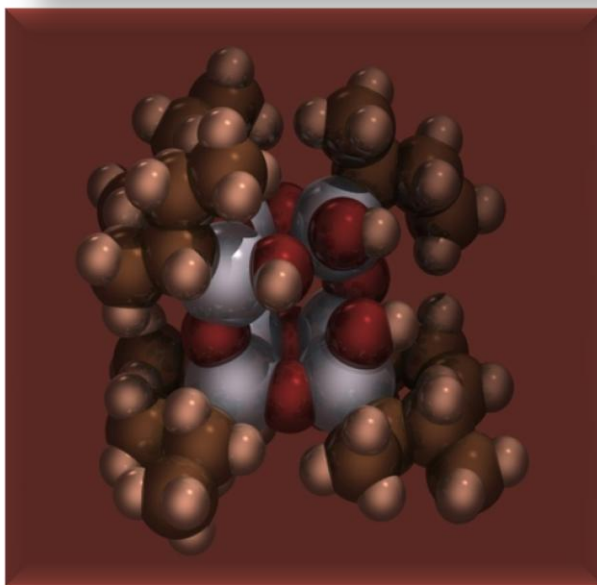
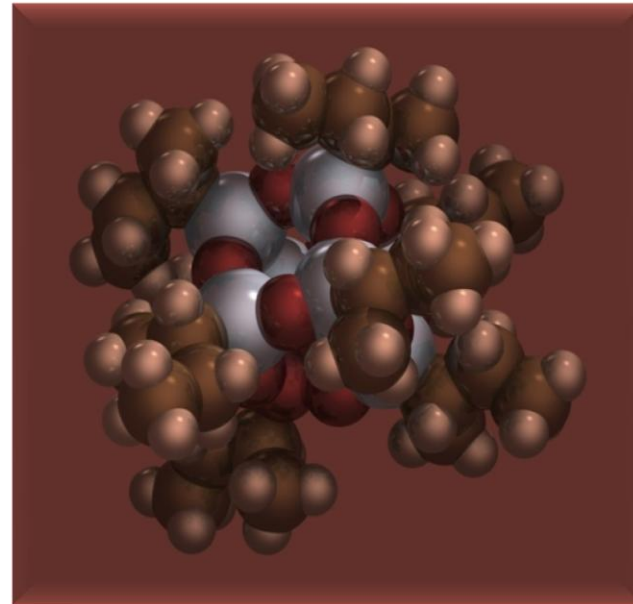
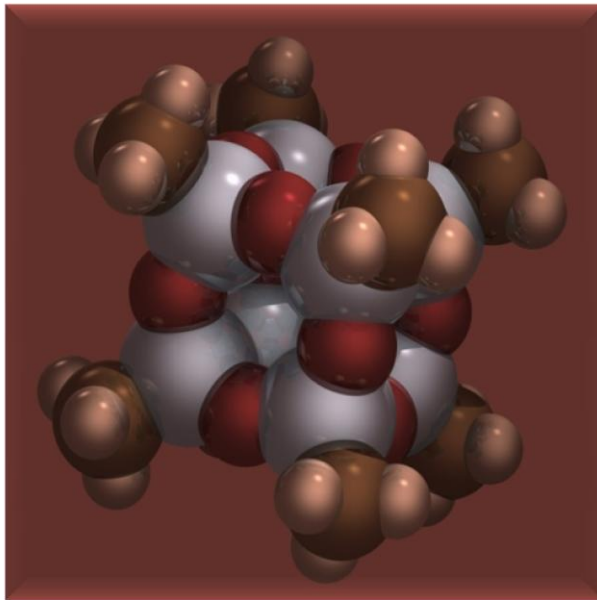
# Overview

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- What is POSS<sup>®</sup>?
- Safety of POSS<sup>®</sup>
- Improved healing
- UV blocking POMS
- New emulsifiers and surfactants
- POSS<sup>®</sup> antioxidants
- New moisture trapping agents
- Conclusions

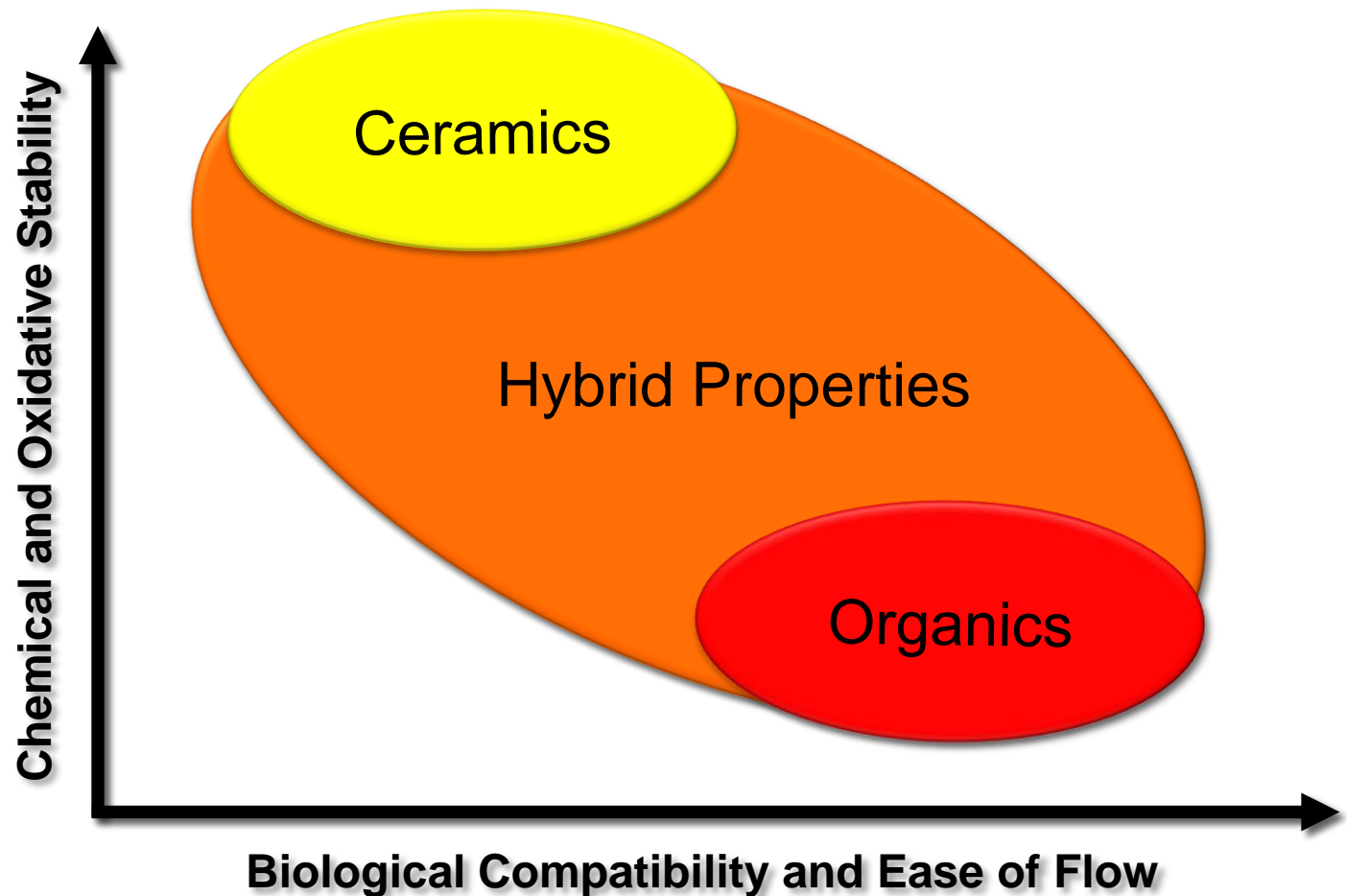


# POSS<sup>®</sup> in 3D



# Why Hybrid Materials?

POSS® is a **unique** hybrid organic-inorganic composition



# What does POSS<sup>®</sup> look like?

## Crystalline Solids

Wide melting range 24 C to 400 C

## Liquids/Oils

Wide viscosity range 1000cP to 100000cP



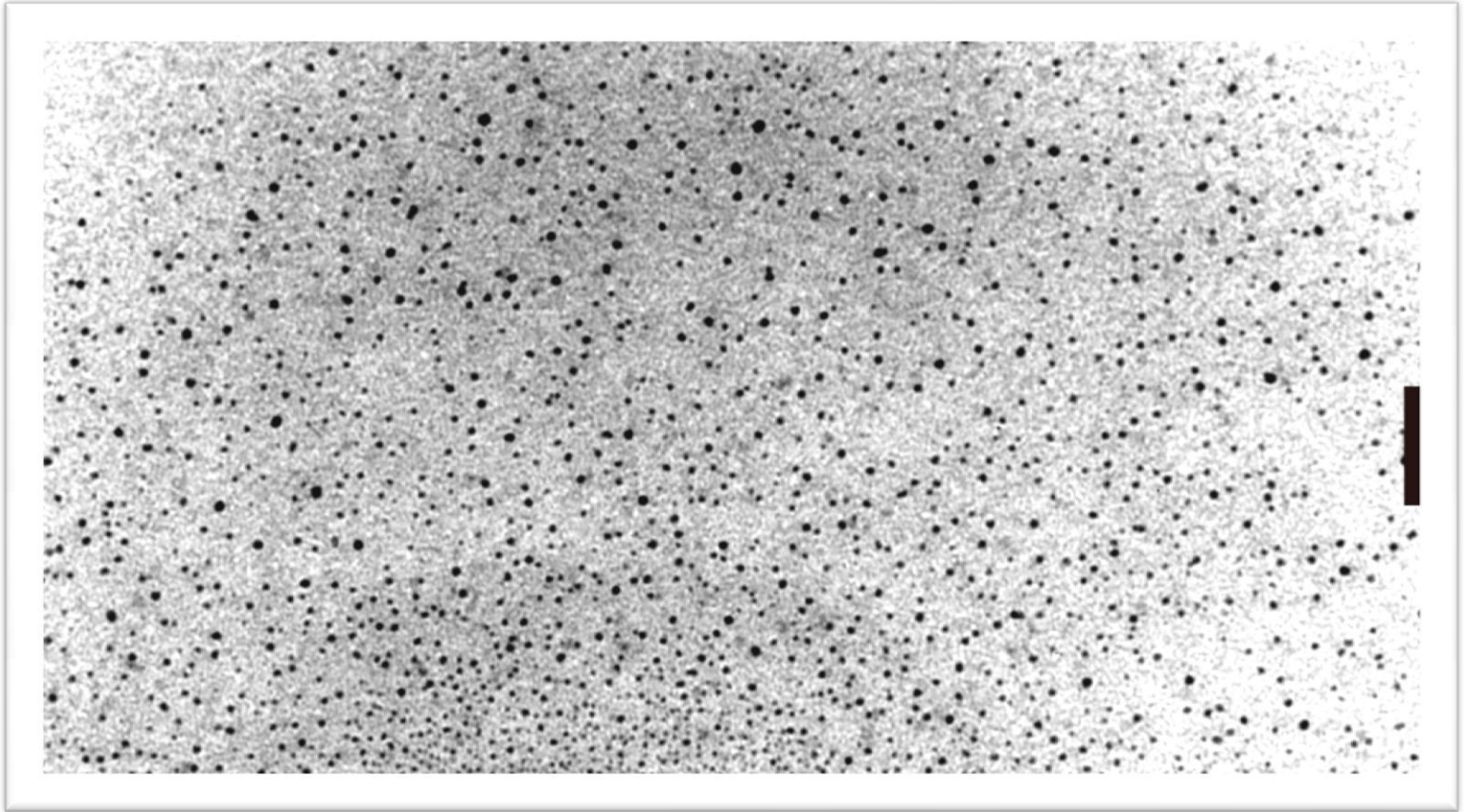
**Waxes**

**Hybrid  
Plastics™**



# Nanoreinforced<sup>®</sup> PP - Molecular Silicas<sup>®</sup>

Each “black dot” represents a 1.5nm POSS<sup>®</sup>



\*scale of bar = 50nm

Viers - US Air Force Research Laboratory

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# Safety of POSS<sup>®</sup>

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Several of the larger production volume POSS<sup>®</sup> types are TSCA listed

## **Octaisobutyl POSS<sup>®</sup> MS0825**

US Category IV Oral LD50 > 5000 mg/kg

## **Octamethyl POSS<sup>®</sup> MS0830**

EU Oral LD50 > 2000 mg/kg

## **Dodecaphenyl POSS<sup>®</sup> MS0802**

EU Oral LD50 > 2000 mg/kg

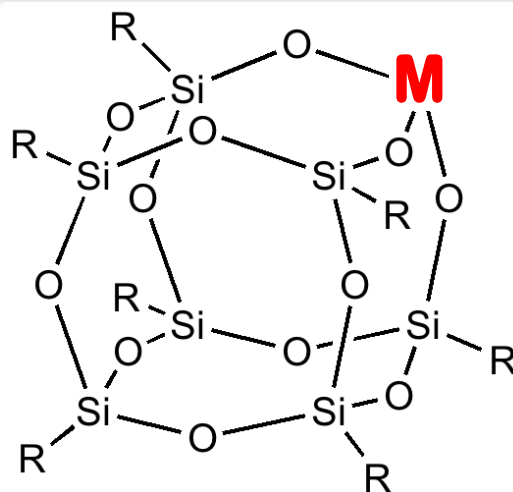
Does **not** require the risk phrase R22  
"Harmful if Swallowed."

Tested on rats by independent accredited laboratory

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# Elements Incorporated into POSS<sup>®</sup>



POMS reported  
 Not yet reported

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac															

Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

# POSS® Aids in healing

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## *Skin Regeneration Using Nanotechnology      Evaluation of Bone Regeneration Utilizing POSS®*

*Dr. Toshihiko Inage, Nihon University*

### **Advanced Materials Symposium, 2007**

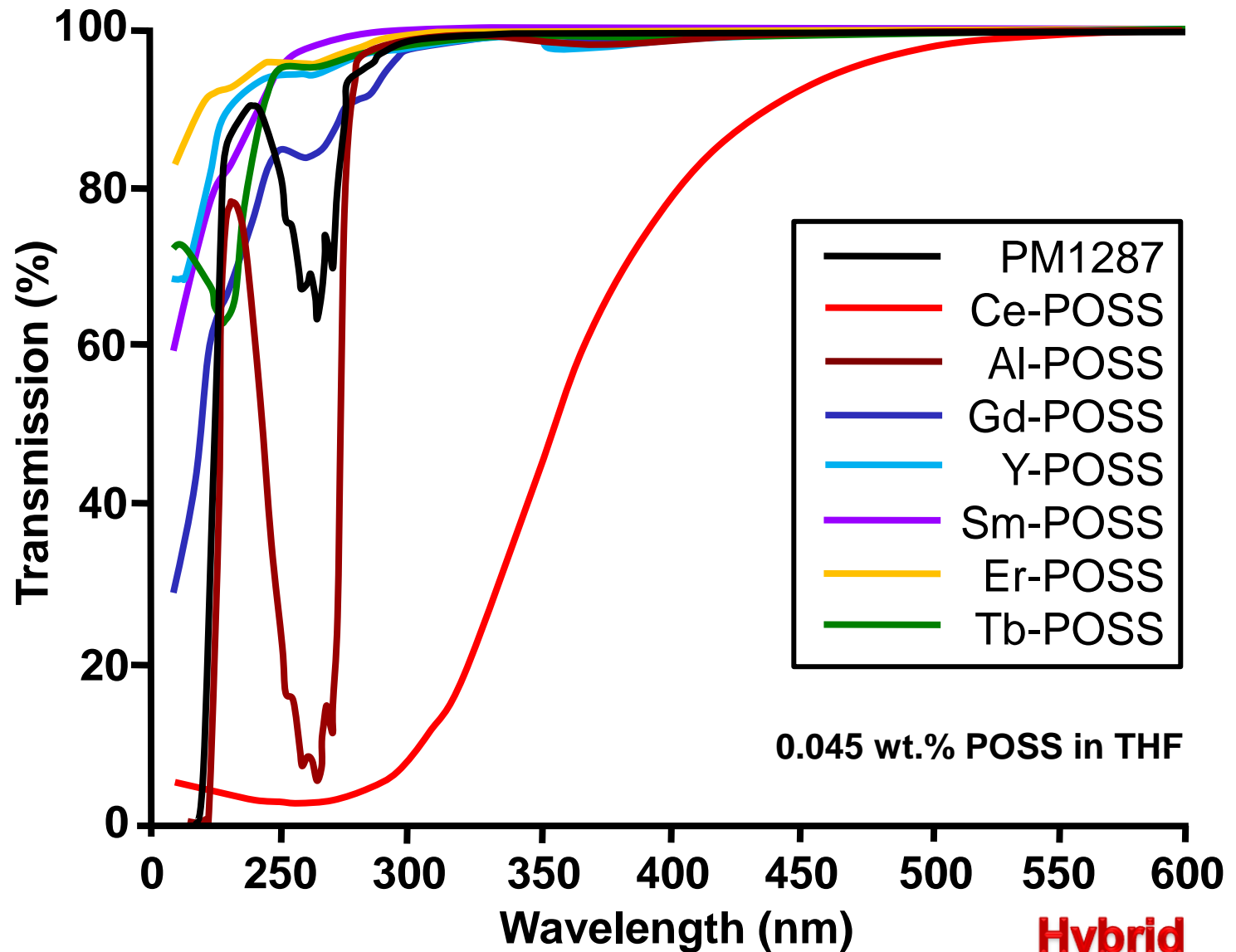
“With POSS®, I found three times the number of blood platelets”.

“POSS® stimulates differentiation of osteoblasts”.

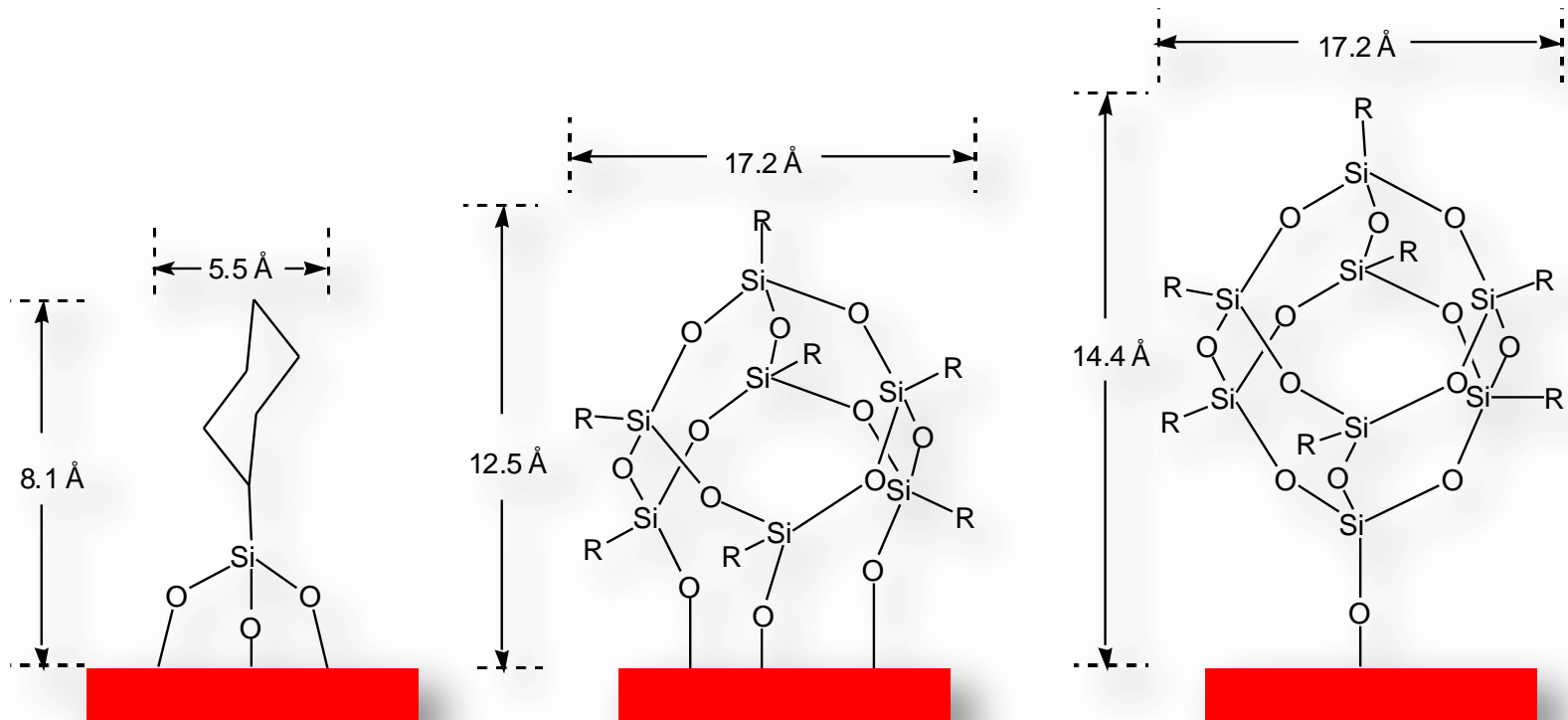
“After 4 weeks, spongy bone was completely replaced by compact bone”.

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

# UV Blocking POMs



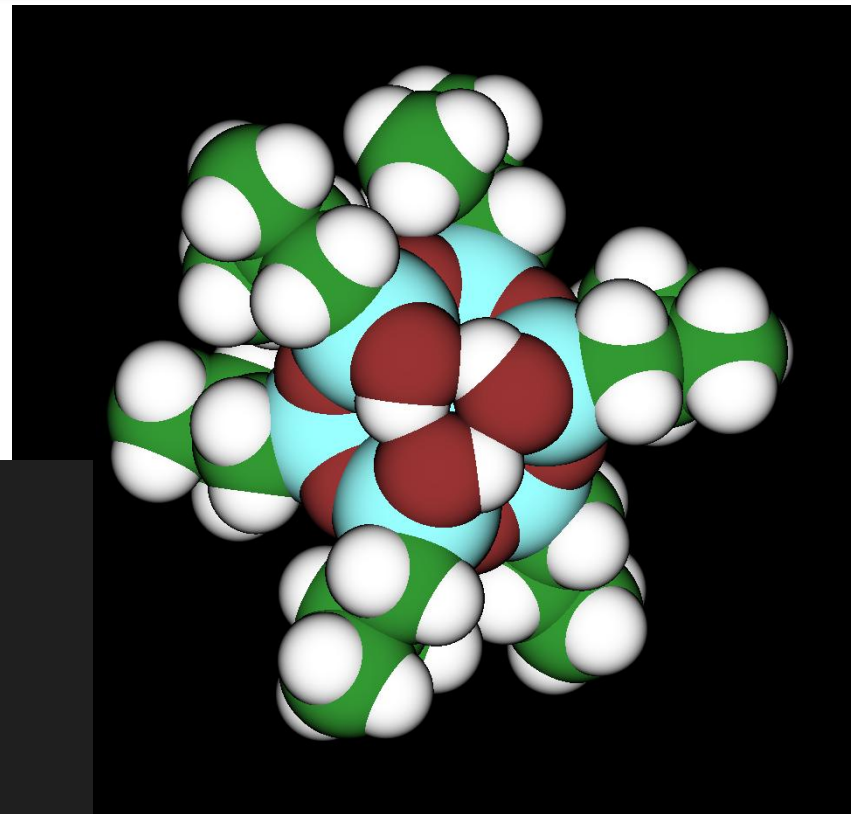
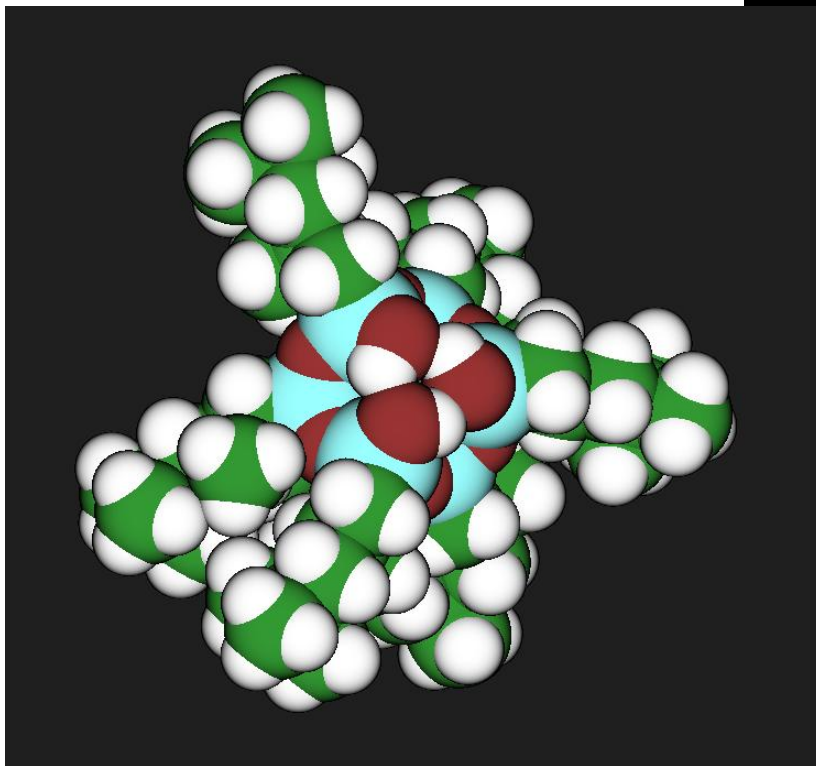
# POSS<sup>®</sup> Dispersants



- Three silanols chelate to give strong bonds to the surface
- POSS<sup>®</sup> cages derivatized to give optimal compatibility with and dispersion in the matrix oil or polymer
- Very effective with TiO<sub>2</sub> and other pigments

# POSS<sup>®</sup> Passivating Agent for Copper

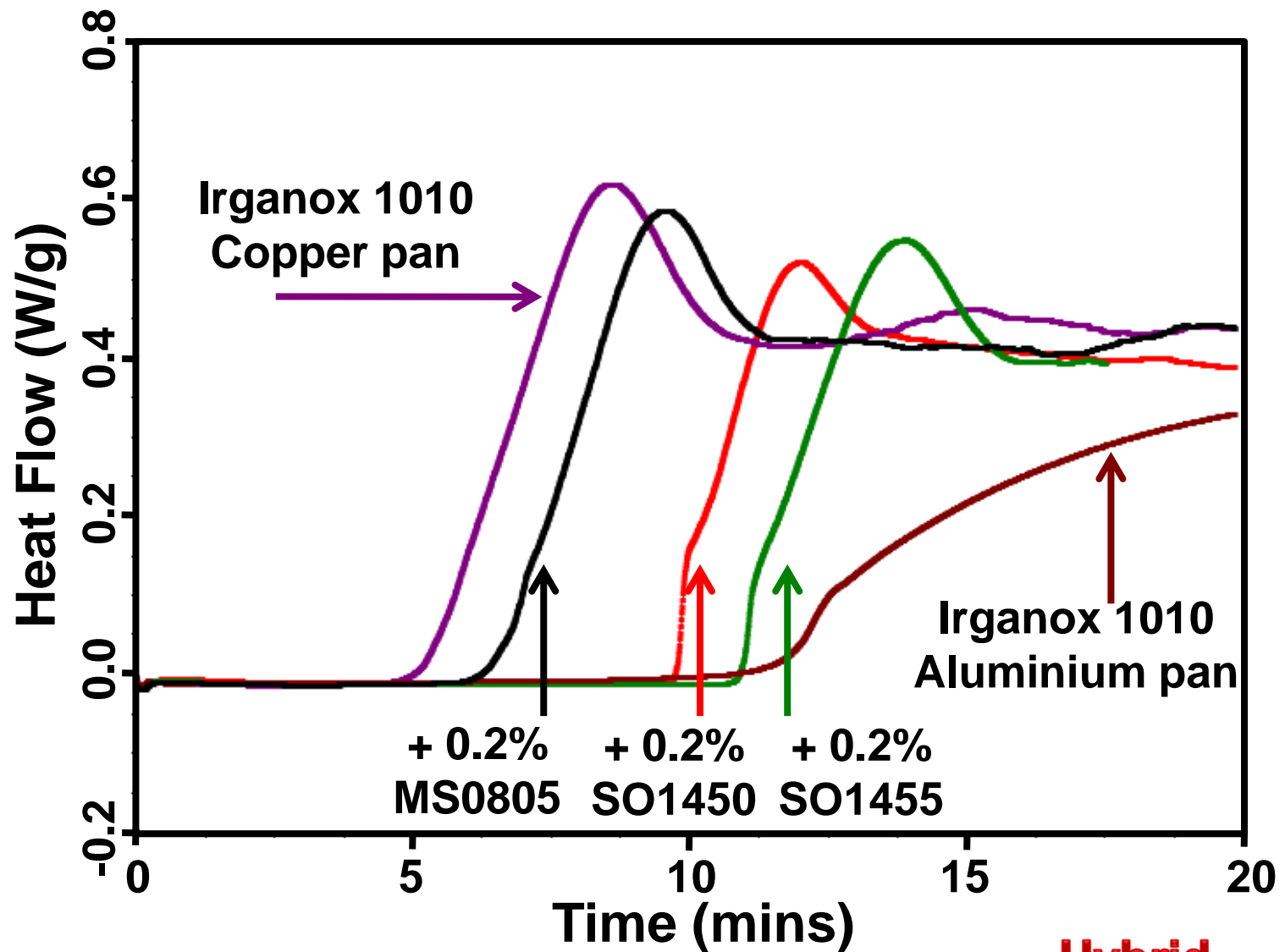
SO1455



SO1450

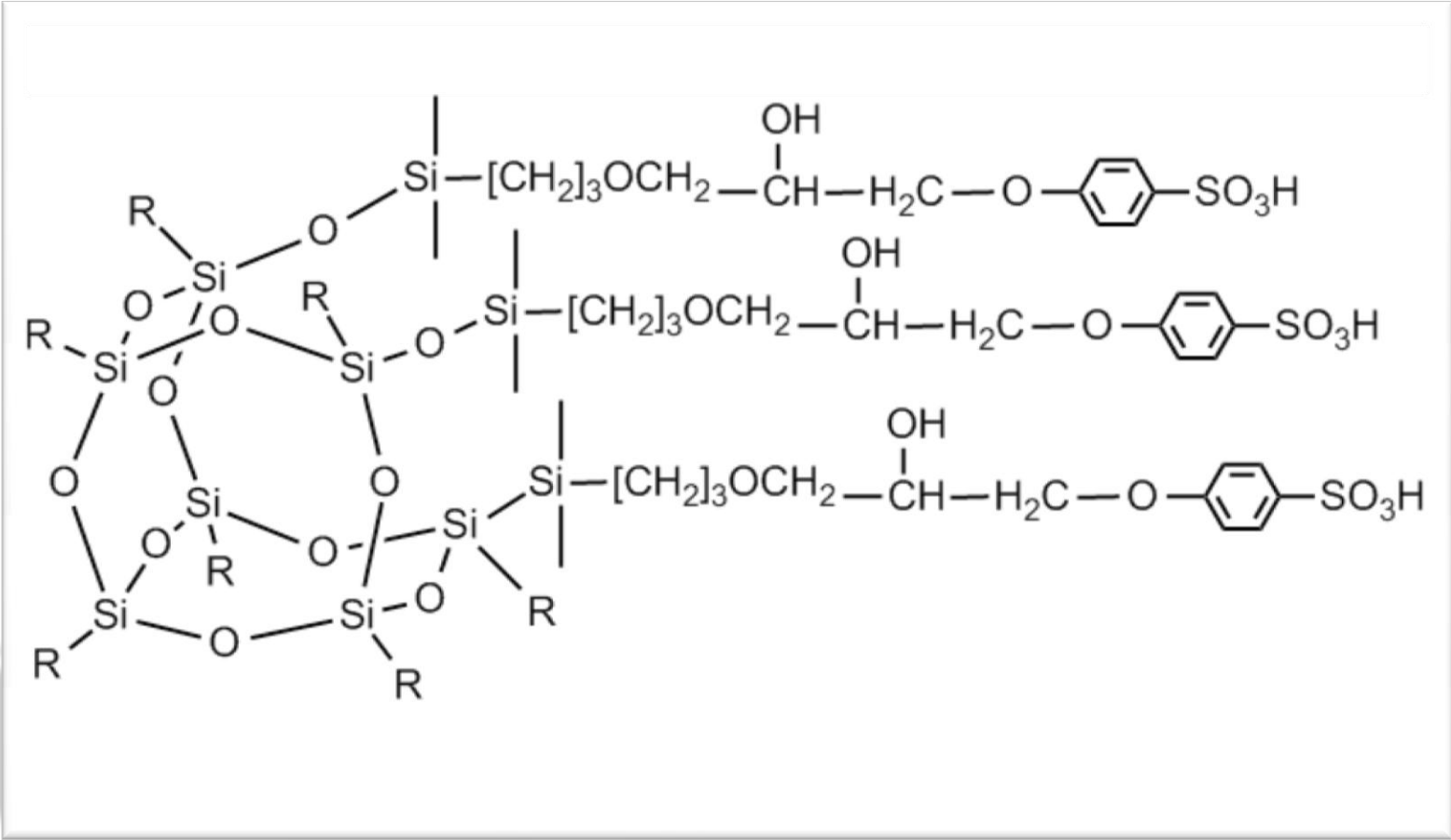


# POSS<sup>®</sup> Passivating Agent for Copper

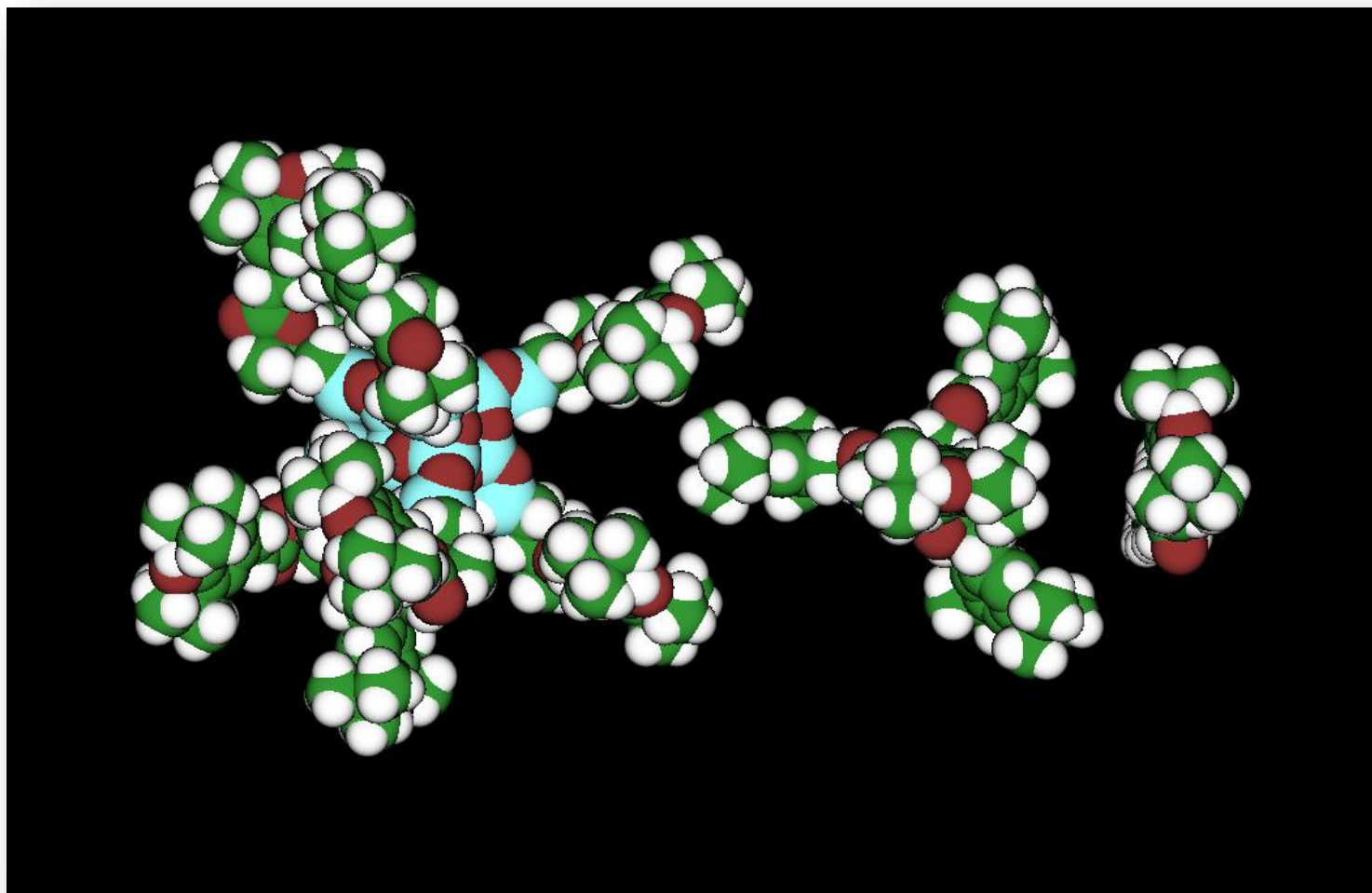


In hydrocarbon oil (squalane) 190 C, oxygen atmosphere

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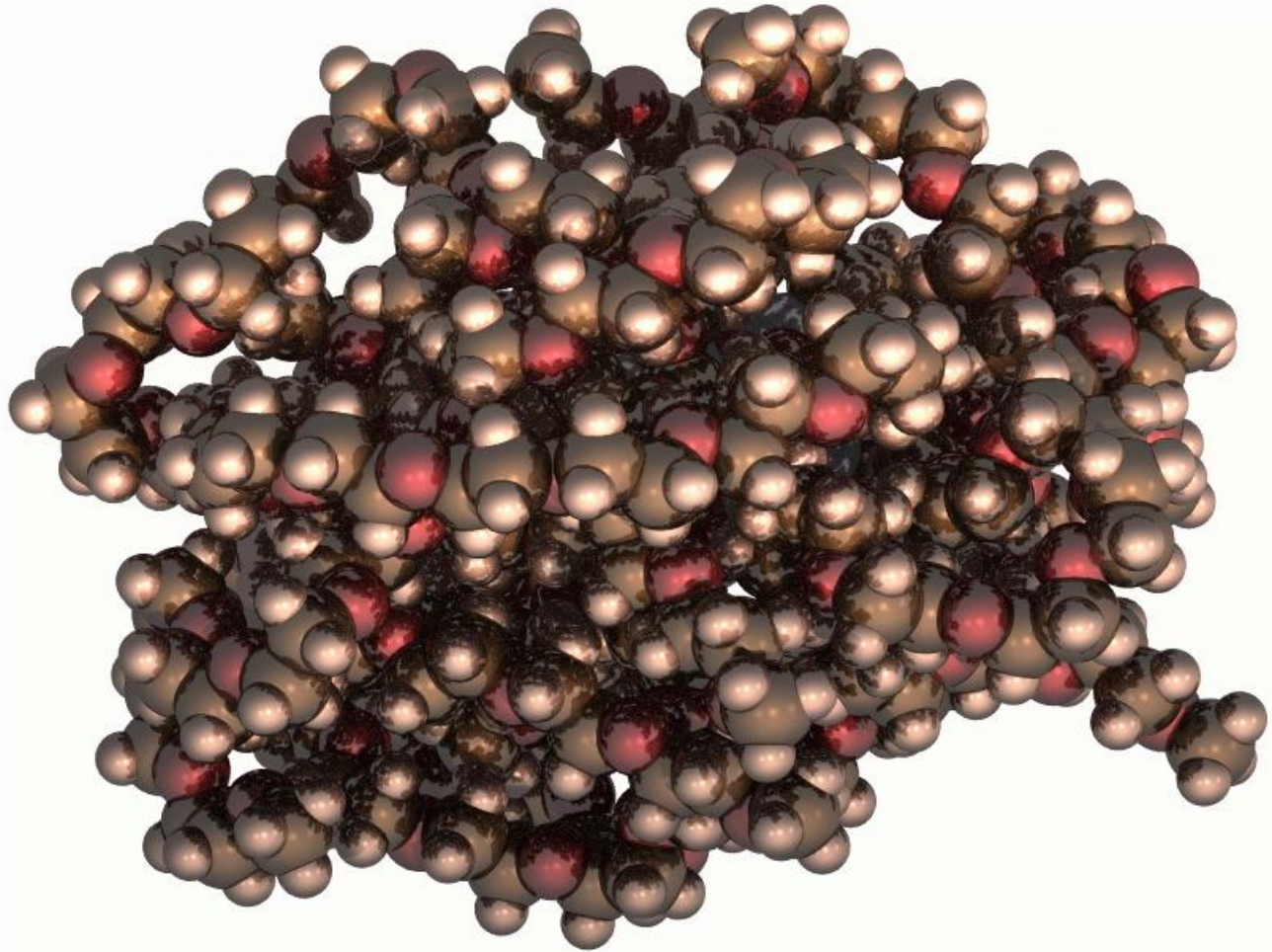


# POSS<sup>®</sup> Antioxidants



# Animation of PEG POSS<sup>®</sup> Humectant

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# Hybrid Plastics Inc.





# Summary

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- POSS<sup>®</sup> 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!*