JOANNEUM RESEARCH MATERIALS

SupreSil®

Extend pot life of silicones to several months and retain material properties

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Platinum (Pt)-cured silicones are gaining in popularity, emphasising addition curing over traditional peroxide methods. They ensure purity and efficacy, resulting in stronger and more aesthetically pleasing products. The rise of Pt-curing marks a significant shift in silicone manufacturing techniques, promising unmatched quality and durability in a variety of applications. However, when curing is initiated by mixing parts A and B, the pot life is limited (minutes to hours) depending on the type of silicone and temperature. This creates practical and technological constraints such as:

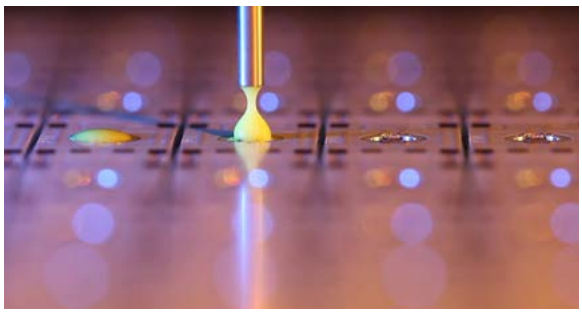
- **short processing time**
- **manufacturing waste**
- **difficult reproducibility**
- **inflexible manufacturing process**

SupreSil®, our patented formulation, extends pot life through reversible inhibition of crosslinking. Unlike systems with state of the art inhibitors our inhibitors evaporate readily and completely once processing begins, even at temperatures below 80 °C, allowing normal cross-linking at mild temperatures for rapid and complete curing while maintaining the original material properties.

Benefits of SupreSil®

- **reduces production costs:** the pot life of silicone mixtures can be extended to several months and beyond
- **enables (3D) printing:** shelf stable, 1-component silicone inks can be formulated for use with a variety of printing processes including processes like dispensing, screen-printing, aerosoljet-printing, inkjet printing and others
- **no change in material properties:** through the complete and trace-free removal of the inhibitor during the curing process there is no change in the material or its properties
- **applicable to liquid Silicone rubber (LSR) and high consistency rubber (HCR)**
- **suitable for all Pt-cure resins:** no curing at processing temperature and normal curing at curing temperature, orthogonal with other inhibitors
- **environmental:** reduction in waste generation in production process

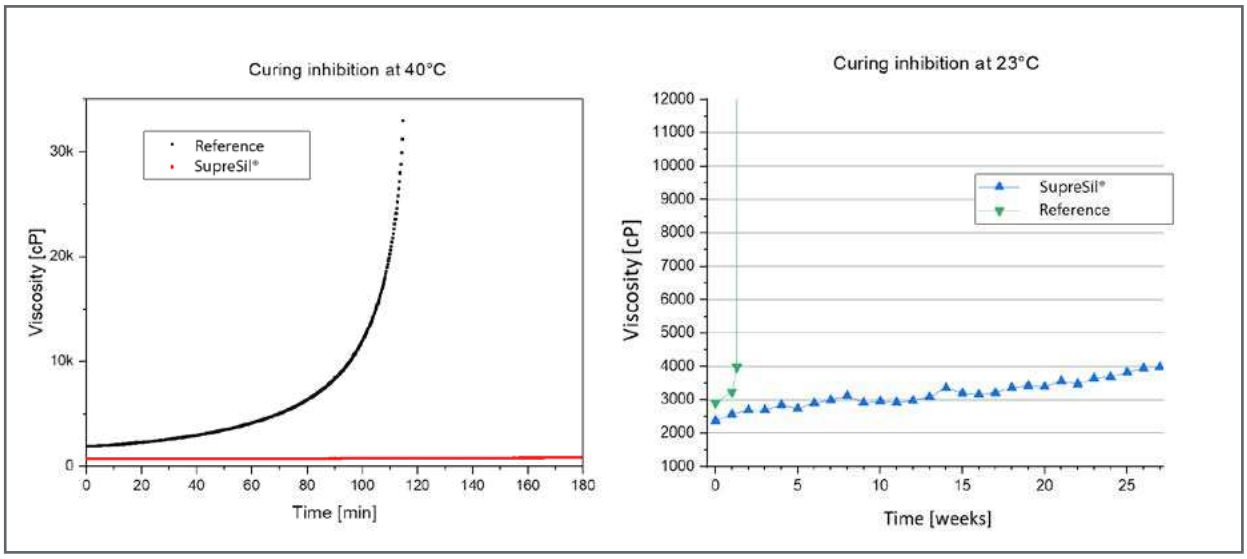
Application examples



LED production: SupreSil® resins reduce the processing efforts and increase the yield of colour conversion materials without changing their optical properties. The Supresil® inhibited silicones can be mixed with colour conversion phosphors in large batches, increasing the accuracy and consistency of the colour conversion composites through improved wetting and distribution of the dispensed material and a better dispersion of the phosphors.

3D printing: Standard LSR formulations are optimised for extrusion and injection moulding machines and are not suitable for 3D printing. By adjusting the rheological behaviour and extending the pot life using SupreSil®, 3D printing is now possible.

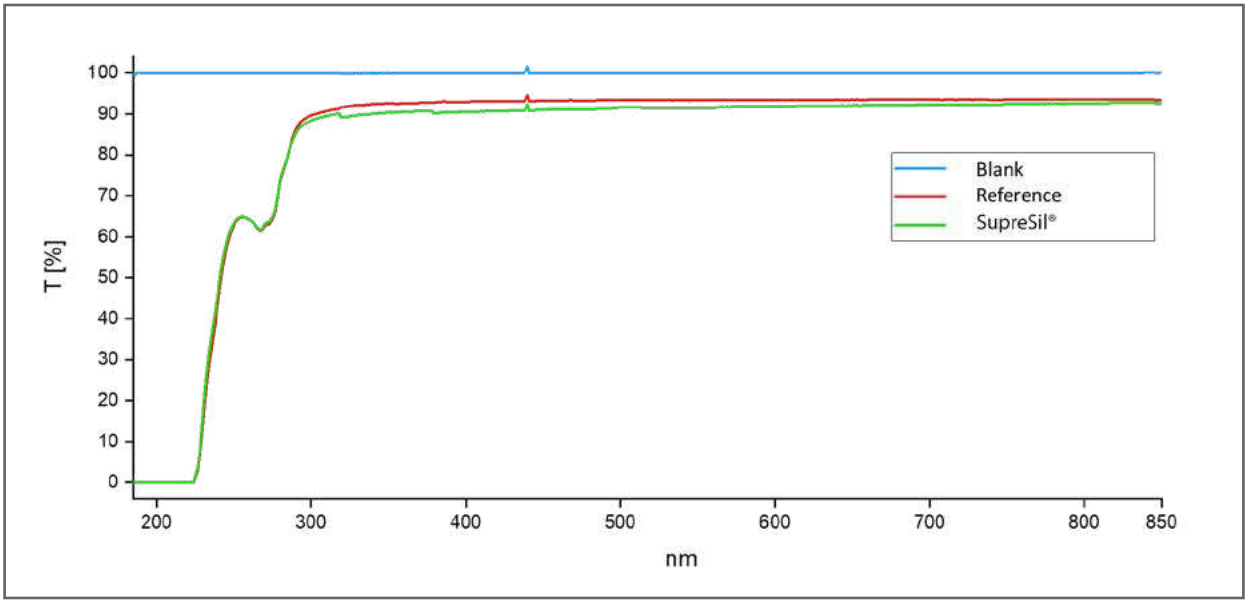
Comparison of curing dynamics of standard silicone resins with SupreSil® inhibited resins



All material properties of the silicones are preserved (through complete and trace-free removal of the inhibitor)

- **physical:** shrinkage, Shore hardness, storage modulus
- **optical:** UV/VIS transmission, no „yellowing“, refractive index
- **biocompatibility:** relevant for medical grade resins / formulations
- **unaltered production:** viscosity, reproducibility

UV/VIS Transmission of cast silicones (100 µm) for the LED production



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SupreSil®

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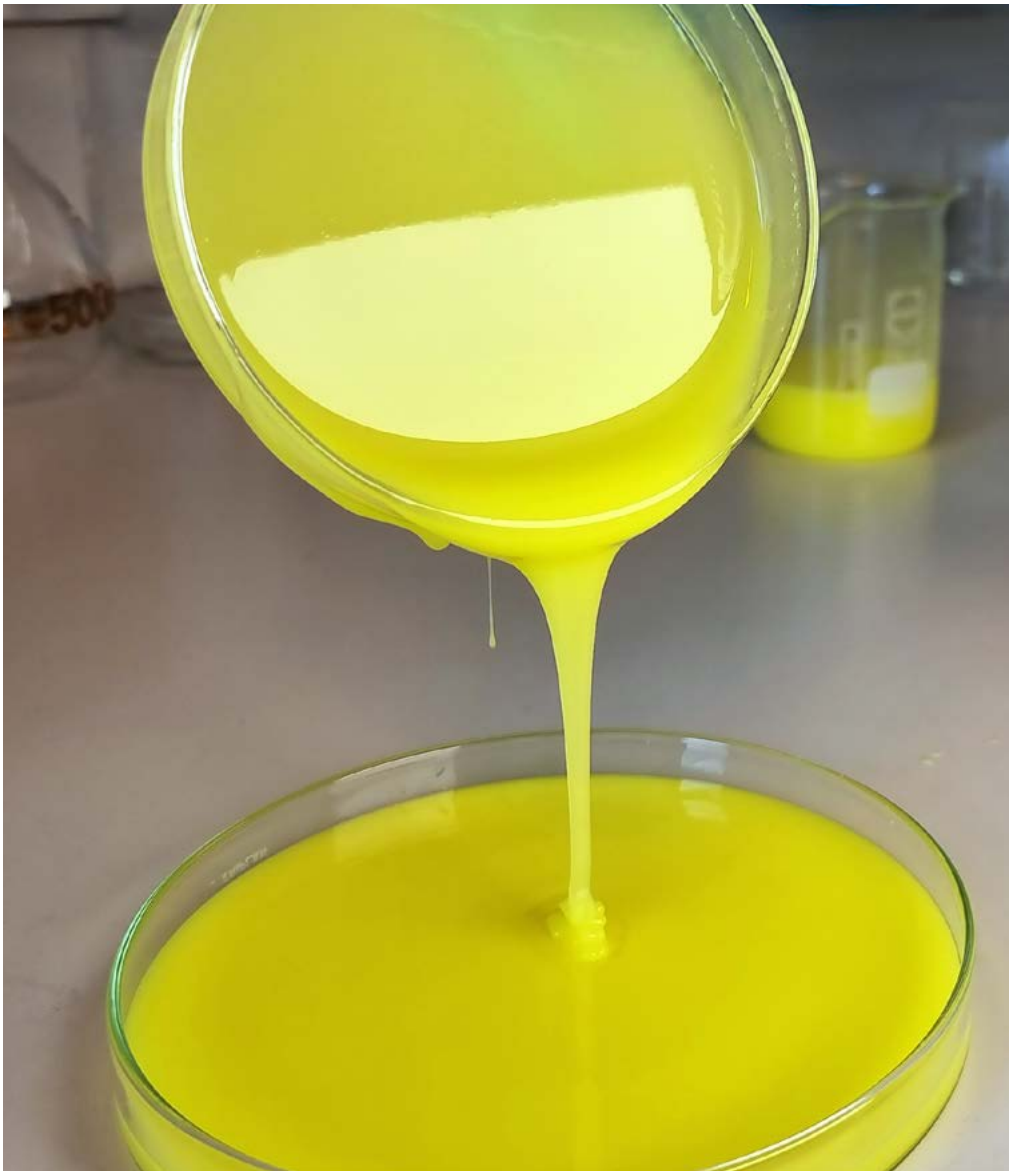

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