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NEWS RELEASE

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GELEST INTRODUCES REVOLUTIONARY ELASTOMERIC AND SHAPE MEMORY MATERIALS

Potential Applications Include Microfluidics and Implantable Medical Devices

MORRISVILLE, Pa. (January 21, 2016) – Gelest, Inc. today introduced a revolutionary technology that will allow design engineers to create innovative devices to meet new applications. This class of elastomers has unprecedented elongation and shape recovery abilities. The new materials break records for elongation and rules of elastomeric behavior. The materials were developed by Gelest with characterization assistance by Lawrence Livermore National Laboratory, Livermore, California, which provided advanced analytical techniques. The scientific journal *Advanced Materials* features a research article describing these materials in this week's issue. Today Gelest is announcing commercialization of the technology. The materials are available now in an industrial grade, Gelest ExSil™ 100, and a more highly refined, biocompatible medical grade.

The silica nanoparticle-reinforced material approaches 5,000% elongation at break.

"A 2-yard piece stretches the length of a football field," said Dr. Barry Arkles, Gelest President and Chief Technology Officer. "By contrast, a highly stretchable elastomer,

such as the rubber in a household rubber band, would break at about 6 to 8 yards, with 200% to 400% elongation at break, while a high-performance stretchable elastomer would extend to about 20 meters, or 1,000% elongation at break."

On a smaller scale, he said, a cylindrical sample with a 1 cm diameter will narrow to approximately 1 mm diameter at full extension and then return to its original shape when tension is released.

"This is not an incremental advance of highly stretchable elastomers, but a revolution in elongation," Dr. Arkles added.

Gelest discovered the materials when looking to build silicones with different functional groups – in this case, a vinyl and a hydride – at opposite ends of a heterobifunctional siloxane macromonomer using a specific technique called "living anionic ring opening polymerization." Gelest created the macromonomer and discovered an unprecedented class of materials when the macromonomer was subjected to a second "step-growth" polymerization. The newly discovered material is an elastomer without the true crosslinks characteristic of typical silicones.

"The elastomer has no apparent crosslinking which is typically a requirement for elastomeric behavior in silicones," said Dr. Jonathan Goff, Gelest Senior R&D Manager, Polymers and Technical Services. "We believe this is the key feature that differentiates this material from conventional silicone elastomers and is what accounts for the unprecedented elongation."

Drs. Goff, Sulaiman and Arkles at Gelest and Dr. Lewicki, Staff Scientist at Lawrence Livermore National Laboratory, detailed their research and analysis in a paper, "Soft

Materials with Recoverable Shape Factors from Extreme Distortion States," published this week by *Advanced Materials* in open access.

The ExSil™ 100 and medical grade elastomers eliminate the limitations of previous materials and open new areas of innovation for design engineers, according to Ed Kimble, Gelest Product Manager Silicones.

He further added, "Gelest envisions a wide range of applications in areas such as microfluidics, implantable medical devices, elasto-mechanical devices, diaphragms, and optical and electronic interconnects and devices."

The ExSil™ 100 elastomer enables design engineers to create microfluidic devices that can withstand movement, elongation and distortion, yet still retain functionality.

"Given its shape-recovering ability, the medical grade is applicable for implantable devices that can be stretched, rolled and inserted into a syringe, injected through a small opening into the body and then, once in place, can return to its original shape," said Kimble. Other potential applications are formable micro-electrode arrays, synthetic skin and other compliant materials (i.e. intelligent plaster, e-skin and Micro-ID).

For more information, or to explore solutions for your new product development initiatives, please contact: Gabrielle Lockwood, Sales & Marketing Associate, at 215-547-1015 or glockwood@gelest.com.

About Gelest

Gelest, Inc., headquartered in Morrisville, Pennsylvania, is recognized worldwide as an innovator, manufacturer and supplier of commercial and research quantities of organosilicon compounds, metal-organic compounds and silicones. Gelest serves

advanced technology markets through a materials science-driven approach. The company provides focused technical development and application support for semiconductors, medical materials, pharmaceutical synthesis, diagnostics and separation science, and specialty polymeric materials: “Gelest – Enabling Your Technology.” www.gelest.com

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