

29004-B Thermo-Responsive Aqueous Polymer Gels

The Technology

Polymer scientists at Sheffield University have designed new anisotropic worm-like copolymer particles (see Figure 1) that form free-standing gels in water at room temperature. These gels are shear-thinning at room temperature. Cooling such gels to below 10°C lead to free-flowing, low-viscosity aqueous solutions (see Figure 2). Rheology studies confirm that this sol-gel thermal transition is reversible, with relatively little hysteresis. The gel properties (critical gelation temperature and gel strength) can be tuned by varying the copolymer concentration and also by adjusting the mean length of the worm-like particles. In principle, such gels can be readily sterilised simply by ultrafiltration at sub-ambient temperatures.

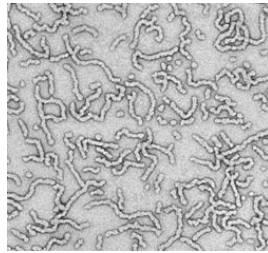


Figure 1. Transmission electron micrograph of copolymer worm-

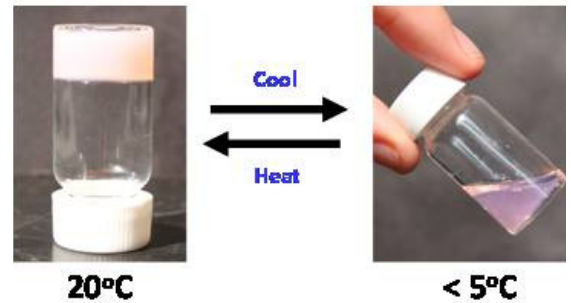


Figure 2. Digital image of (left) a free-standing gel formed at 20°C by an aqueous solution of worm-like copolymer particles and (right) a free-flowing aqueous solution obtained on cooling this gel to below 5°C. This thermal transition is fully reversible., although rheological studies suggest some hysteresis effects.

Intellectual Property

A patent application has been filed that covers various aspects of this technology and likely applications.

The Opportunity

We are currently seeking commercial partners and licensees to collaborate on the technical development of the utility of these particles. Based on initial data, we anticipate that these materials will be useful for:

- Injectable gels for drug release applications
- Thermo-responsive gels for organ printing (as an alternative to tissue engineering)
- Viscosity modifiers for cosmetic formulations
- Scaffolds or templates for the deposition of inorganic oxides (or other inorganic materials)

For commercial enquiries on this technology, please contact Andrew Tingey, quoting reference 29004.

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