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Vahid Forooqi Motlaq, Kenneth D. Knudsen, Bo Nyström

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## Effect of PEGylation on the stability of thermoresponsive nanogels

Vahid Forooqi Motlaq,<sup>a</sup> Kenneth D. Knudsen,<sup>b,\*</sup> Bo Nyström<sup>a,\*</sup>

<sup>a</sup>*Department of Chemistry, University of Oslo, Blindern, P.O. Box 1033, Blindern, N-0315 Oslo, Norway*

<sup>b</sup>*Department of Physics, Institute for Energy Technology, P. O. Box 40, N-2027 Kjeller, Norway*

### ABSTRACT:

In biomedical applications, PEGylation is frequently utilized to enhance the nanoparticles (NPs) capability for long systemic circulation times in the blood and it is also crucial to stabilize the NPs and thereby minimize their ability to agglomerate. In this study, we have synthesized poly(*N*-isopropylacrylamide) (PNIPAAm) nanogels with covalently attached PEG chains of different length and PEG coating densities. It is observed that in the absence of PEG coating the nanogels aggregate at elevated temperatures. It is found from dynamic light scattering (DLS) that both increased PEG length and enhanced PEG coating density have crucial influence on the stability of the nanogels. The results show that long PEG chains have a stronger impact on the shielding ability of the PEG layer on the nanogels than a high coating density of short chains. The small angle neutron scattering (SANS) measurements on PEG-coated nanogels indicate that the coated layer contract at higher temperatures but still the particles are stabilized. The bare PNIPAAm nanogels can be electrostatically stabilized by adding a small amount of an ionic surfactant.

**Keywords:** Nanogels, PEGylation, Stability, Dynamic light scattering, Small angle neutron scattering

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