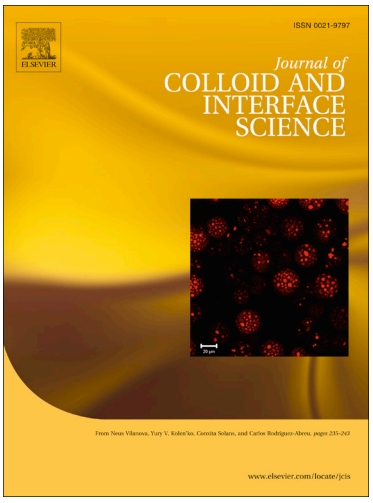

Effect of PEGylation on the stability of thermoresponsive nanogels

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PII: S0021-9797(18)30395-3
DOI: https://doi.org/10.1016/j.jcis.2018.04.024
Reference: YJCIS 23489

To appear in: *Journal of Colloid and Interface Science*

Received Date: 2 March 2018
Revised Date: 29 March 2018
Accepted Date: 5 April 2018

Please cite this article as: V. Forooqi Motlaq, K.D. Knudsen, B. Nyström, Effect of PEGylation on the stability of thermoresponsive nanogels, *Journal of Colloid and Interface Science* (2018), doi: https://doi.org/10.1016/j.jcis.2018.04.024

Effect of PEGylation on the stability of thermoresponsive nanogels

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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