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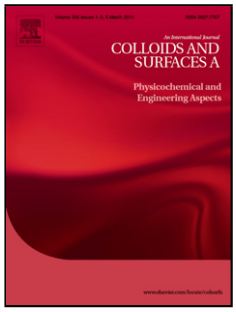

Title: Study of N-isopropylacrylamide-based microgel particles as a potential drug delivery agents

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STUDY OF N-ISOPROPYLACRYLAMIDE-BASED MICROGEL PARTICLES AS A POTENTIAL DRUG DELIVERY AGENTS

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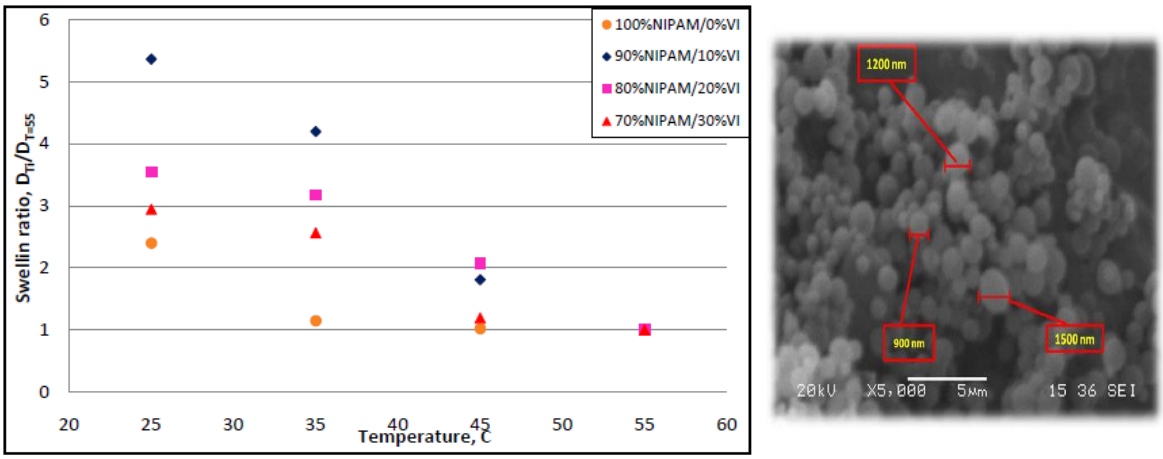
Graphical abstract



Highlights

N-isopropylacrylamide -based microgels were synthesized.
The particles' size as a function of temperature was investigated.
The effect of pH on size of the microgel dispersions were investigated.
The resultant microgels swelled or shrunk in response to various external stimuli.
The LCST shifted towards the temperature of human body
These materials potentially useful as a sensors or controlled release agents for drug-delivery systems.

Abstract

This paper is devoted to the investigation of N-isopropylacrylamide-based microgels as potential drug delivery systems and other pharmaceutical applications. Surfactant free emulsion polymerization (SFEP) and emulsion polymerization techniques were employed to copolymerize PNIPAM with acrylic acid (AA), with 3-acrylamidophenylboronic acid (3-APB) and (3-acrylamidopropyl)trimethylammonium bromide (ATMA), and with 1-vinylimidazole (VI). The resultant microgel particles exhibited multi-responsive behaviour being sensitive to changes in temperature, pH. The PNIPAM-co-3-APB-ATMA microgels were sensitive to concentration of glucose, whilst the PNIPAM-co-VI microgels were sensitive to certain metals, copper in particular. The microgel containing AA exhibited characteristic temperature-sensitive behaviour with volume a phase transition temperature (VPTT) in the range of 35^0-40^0C and showed pH-sensitive features as