

## Multifunctional Au@pNIPAM Microgels for detection of EGFR by Surface-Enhanced Resonance Raman Spectroscopy (SERRS)

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A surface-enhanced resonance Raman spectroscopy (SERRS) method has been developed for the detection of cells expressing the Epithelial Growth Factor Receptor (EGFR), a biomarker that is overexpressed in cancer. The SERRS active microgels were prepared by conjugating polyisopropylamide (pNIPAM) coated gold nanoparticles with receptor-specific antibodies and dye molecules. The microgels were prepared by coating gold nanoparticles with a porous thermoresponsive polymer shell (pNIPAM), which allows the diffusion of the dye molecules, followed by coating with polyacrylic acid through layer-by-layer technique. The functionalization of the microgels with specific antibodies against EGFR by carbodiimide chemistry, allowed specific binding to EGFR-expressing cells grown *in vitro*. The presence of EGFR was determined by Raman spectroscopy. Our results demonstrate that the multifunctional Au@pNIPAM microgels can be used as substrates for sensitive detection of EGFR by SERRS and for the generation of new multiplexing platforms.

