524 - Selective detection and magnetic removal of bacteria using novel porous PEG microgels combining magnetic properties and biofunctionalization with carbohydrate ligands

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We present a new microparticle system for the selective detection and magnetic removal of bacteria. We use porous PEG microgels obtained via hard templating from $CaCO_3$ spheres as a platform to introduce two features: a) magnetic properties via the electrostatic binding of iron oxide NPs to the microgels and b) specific binding of pathogens via the functionalization with sugar ligands. The resulting magnetic, porous, sugar-functionalized (MaPoS) PEG microgels are able to specifically detect bacteria in solution via their carbohydrate ligands and to bind these bacteria in high efficiency due to their porous structure, 3-4 times more bacteria than comparable non-porous systems. Furthermore the use of sugar ligands allows for the differentiation between different bacteria strains. Using both features, magnetic properties and binding of bacteria, we were able to easily remove bacteria from highly concentrated solutions. Thus MaPoS particles show great potential for various applications in analytical medicine and biotechnology.