Janus particles are the particles having different properties (such as charge, polarity, optical or magnetic properties) at opposite sides and are an example of synthetic asymmetrical systems. Combining of dissimilar properties in one material makes Janus particles unique among other colloidal particles. A particularly interesting group of JPs comprises the ones specifically responding to change of environmental conditions. Apparently, grafting of two polymers with different sensitivities on opposite sides can further diversify responsive properties of JPs. [1] The Janus particles are promising building blocks for design of switchable functional interfaces and surfaces.

We used a new versatile concept for the synthesis of JPs decorated with two sorts of stimuli-responsive polymers. Polymer brushes are immobilized to the opposite sides of micrometer sized silica particles using their switchable behaviour. The first polymer was immobilized on one side of the silica particles using surface-initiated atom transfer radical polymerisation (ATRP) – ‘grafting-from’ approach. The second polymer was immobilized using ‘grafting-to’ method [1,2]. It was demonstrated that prepared Janus particles decorated by two oppositely charged polyelectrolytes showed stimuli-responsive properties in aqueous dispersions upon changes of pH. Moreover, reversible formation of hierarchically structured aggregates from JPs was found. This property of Janus particles was used for preparation of functional coatings and water repellent textiles. [2-3] (Fig. 1).