KWS-1 high-resolution small-angle neutron scattering instrument

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KWS-1 is a classical pin-hole based small angle neutron scattering diffractometer, operated by the Jülich Centre for Neutron Science (JCNS) at the Heinz Maier-Leibnitz Neutron source in Garching [1].

With the capability to perform high resolution measurements (due to its 10 % wavelength selector), KWS-1 is highly suitable for highly ordered or highly monodisperse system investigations. Other typical applications concern the study of colloidal systems, such as nanocomposites, polymer gels, networks (as sketched in Figure 1), polymer blends, di- or poly-block copolymers, microemulsions, complex fluids and micelle/ liposome based systems, as for samples of biological interest.

The wide sample environment and accessories available [2], make KWS-1 an instrument exploitable for several purposes, like Rheo-SANS studies, investigations of systems at high pressure, examinations of high/low temperature phenomena, kinetics of demixing, formation, aggregation, protein structure and folding/unfolding, as well as Grazing Incidence Scattering experiments.



Figure 1. Nano-structured organic–inorganic composite micro-granules have been found to be useful in numerous technological applications, including water-treatment and bio-remediation. Here, nano-structured *silica–Escherichia coli* composite micro-granules have been synthesized by spray drying of mixed suspension droplets of silica and E. coli and subsequent calcination, in order to form shape-matched macro-pores by removing the bacterial cells. Such granules imprinting can be used in water purification because of their ability to filter selective microbes from contaminated water. The optimization of calcination temperature is crucial and has been controlled with SANS experiments performed at KWS-1 [3].

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