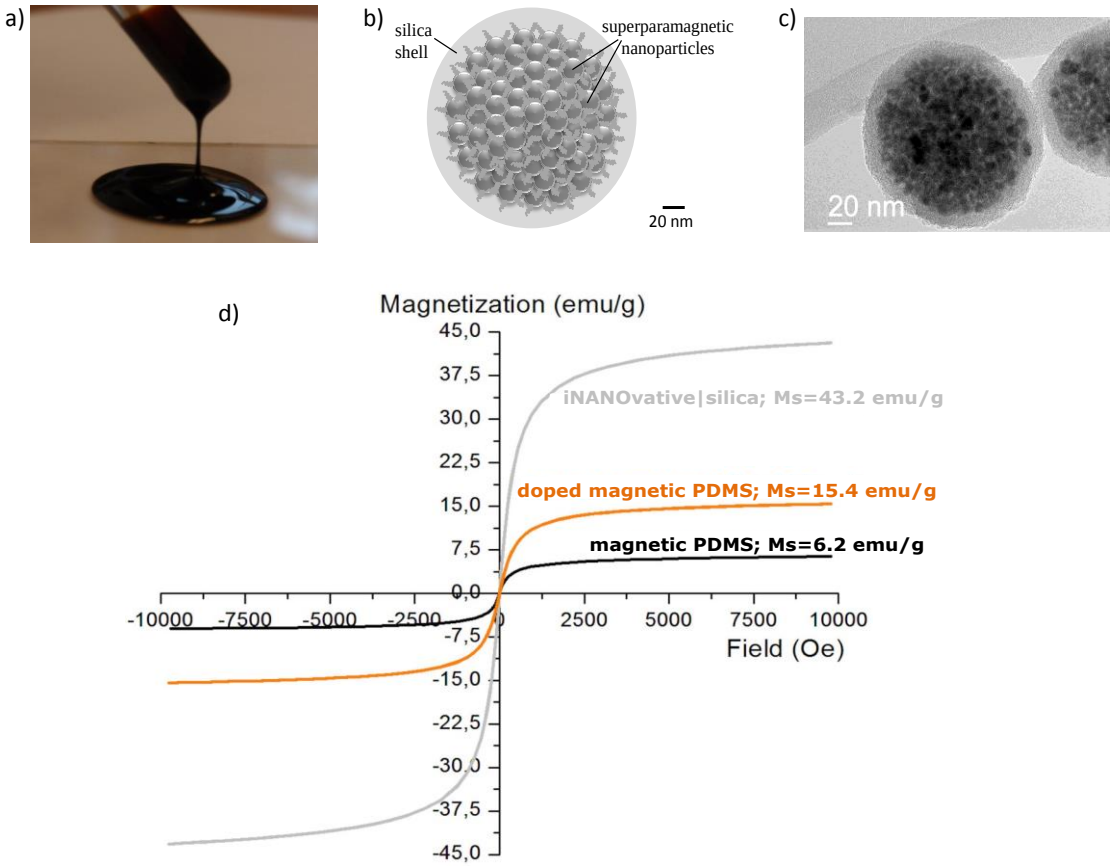
Electronic Supplementary Information 3 (ESI_3)

The commercially available magnetic PDMS (sSPIONs™|PDMS) is composed of superparamagnetic maghemite nanoparticles (size ~10-13 nm) homogeneously dispersed in viscous PDMS (4-5% aminopropylmethylsiloxane-dimethylsiloxane copolymer; viscosity: 120-180 cSt). The magnetic PDMS is a homogeneous, viscous, and transparent brown-red liquid (ESI_3a). It is stable from the chemical and colloidal point of view for at least 6 months as is affirmed by provider. The fraction of magnetic nanoparticles in PDMS is approx. 10 % by weight. The magnetic PDMS has a saturation magnetization of ~6.2 emu/g (see ESI_3d) and shows no remanent magnetization and no coercivity at room temperature. The magnetic nanoparticles were prepared as described in a previous publication: S. Kralj, D. Makovec, S. Čampelj, M. Drofenik, *J. Magn. Magn. Mater*. 2013 **322** 1847.

The magnetic microparticles were prepared from a mixture of magnetic PDMS and maghemite nanoclusters (iNANOvative™|silica), which are both superparamagnetic materials. The nanoclusters are composed of approx. 70 superparamagnetic maghemite nanoparticles (crystal size is ~10 nm) (ESI_3b and c) with a saturation magnetization of ~43.2 emu/g (see ESI_3d). The saturation magnetization of the microparticles has approx. the same value as for the doped magnetic PDMS (magnetic PDMS and maghemite nanoclusters), which was measured at ~15.4 emu/g (see ESI_3d).



ESI_3. a) Magnetic PDMS (sSPIONs™|PDMS), b) schematic view and c) TEM image of superparamagnetic maghemite nanoclusters (iNANOvative™|silica), d) magnetization of magnetic PDMS (sSPIONs™|PDMS), superparamagnetic nanoclusters (iNANOvative™|silica) and doped magneric PDMS in dependence of the magnetic field.