In this study superparamagnetic nanoparticles (Fe₃O₄) sterically stabilized by sodium oleate were prepared by coprecipitation method and consequently modified with polyethylene glycol (PEG) to produce biocompatible magnetic fluid (MFPEG). The chemical composition of the surface is especially important to avoid the action of the reticuloendothelial system (RES), which is a part of the immune system, to increase the half-life in the blood stream. Coating the magnetic particles with a PEG causes increase of the circulatory half-life from minutes to hours or days. The adsorption of PEG with an average molecular weight of 1 kDa with different weight ratios of PEG/Fe₃O₄ x = 0.5 – 30 was studied by differential scanning calorimetry (DSC). The zeta potential as well as colloidal stability of prepared samples were investigated by dynamic light scattering method. Morphology and particles size distribution were observed by scanning electron microscopy (SEM). Mean diameter of coated nanoparticles was found to be at 73 nm (Fig. 1) in comparison with unmodified nanoparticles diameter D = 61 nm.

DSC measurements confirmed the melting temperature (T_m) of pure PEG at T_m = 47 °C and the temperature was not changed for the physical mixture prepared by simply mixing of PEG powder and MF, too. However, in the system of adsorbed PEG on MF, the T_m of PEG was shifted to a lower temperature of about 41 °C (Fig. 2). It is evident that the prepared sodium oleate–magnetite nanoparticles were coated by PEG. The high values of the zeta potential (ca. -50 mV), suitable diameter and colloidal stability of the prepared samples give us positive signal for their application in magnetic drug targeting.

**Acknowledgments**

This work was supported by implementation of the projects Nos. 26220120033 and 26220220005 provided by the European Regional Development Fund. The authors are also grateful to the Slovak Academy of Sciences – the Centre of Excellence "Nanofluid" and VEGA No. 0077.