Thermal analysis of magnetic nanoparticles modified with dextran

A. Juríková, K. Csach, J. Miškuf, M. Koneracká, V. Závišová, M. Kubovčíková and P. Kopčanský

Institute of Experimental Physics, Slovak Academy of Sciences, Watsonova 47, 040 01 Košice, Slovakia

Magnetic fluids are stable colloidal suspensions of magnetic nanoparticles dispersed in a liquid carrier. Due to their magnetic properties and fluidity they offer some attractive possibilities in biomedicine. They can be used as therapeutical agents against wide range of tumours and amyloid-related diseases. In order to be used for biomedical purposes they have to be stable and biocompatible, and so the magnetic nanoparticles are modified by an additional biocompatible substance such as poly(D,L-lactide-co-glycolide) polymer, polyethylene glycol, polysaccharide polymer dextran or bovine serum albumin protein. Thermoanalytical methods - differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA) are very useful tool in the thermal characterization of these complex systems. In the work the thermal behaviour of the magnetic nanoparticles modified with polysaccharide dextran with different weight ratios to the magnetite Fe_3O_4 was investigated using DSC and TGA methods. The adsorption of dextran on magnetic nanoparticles has been confirmed and the influence of the dextran amount in magnetic fluid on the thermal decomposition of dextran has been determined. The results have shown that magnetite catalyses the thermal decomposition of dextran, the adsorbed dextran shows lower initial decomposition temperatures in comparison with the free one.

9.7 cm

13.4 cm

Subject category :

7. Applications

Presentation mode :

poster

Corresponding author :

Alena Juríková

Address for correspondence :

Institute of Experimental Physics
Slovak Academy of Sciences
Watsonova 47
040 01 Košice
Slovakia

Email address :

akasard@saske.sk