Surface analysis of various materials (especially *in situ*) is very important from the economic and scientific point of view. Such studies are especially difficult for so-called buried interfaces (surfaces between two “dense” media, for example, the interfaces between the solid samples and the liquids), which include interfaces of various biological samples in the “natural” environment, very important from the practical point of view. One of the tools which can be used for investigations of such interfaces is so called shell-isolated nanoparticle-enhanced Raman spectroscopy – *SHINERS*. In this technique the analysed surface is covered with the layer of surface-protected plasmonic nanoparticles (*e.g.*, from gold or silver), and then the Raman spectrum of the investigated sample is recorded. Metal plasmonic nanoparticles act as electromagnetic resonators, significantly enhancing the electric field of the incident electromagnetic radiation, and hence leading to very large increase of the Raman signal from the surface on which nanoparticles have been spread. The ultrathin protecting layer (usually from silica or alumina) does not damp surface electromagnetic enhancement, however, separates nanoparticles from direct contact with the probed material and keeps them from agglomerating. Using this method it is possible, for example, to record high-quality Raman spectra of various molecules adsorbed at surfaces of metal single-crystals, or Raman spectra of some biological samples, as walls of living cells.

One of the main problems in *SHINERS* measurements is homogeneous deposition of the plasmonic nanoparticles on the analysed surface. Standard deposition of such nanostructures (deposition of the suspension of nanoparticles and the following evaporation of the solution) leads to strongly heterogeneous distribution of nanoresonators on the analysed surface. Combination of the magnetic and plasmonic properties in the bifunctional nanocomposites, which are going to be synthesised, should give a new material for *SHINERS* analysis which can be significantly easier deposited and removed from the investigated surfaces. Such *SHINERS* nanoresonators will be especially useful in measurements of very delicate samples, for example, surfaces of biological objects. Therefore, the aim of the proposed project is synthesis of a new type of *SHINERS* nanoresonators in the form of core-shell nanoparticles *M@P@T*, where *M* is a magnetic material, *P* denotes a plasmonic material and *T* denotes transparent protecting layer. Surface-protected magnetic-plasmonic nanoparticles have not been obtained so far, however, some magnetic-plasmonic structures without protecting layer have been already synthesised. When ultra-thin SiO_2 layer is deposited on very rough metal nanostructures (unfortunately thicker protecting layers could not be used for *SHINERS* measurements) some parts of the surface of such metal nanostructures are usually not covered, therefore, one can assume that the reason why the surface-protected magnetic-plasmonic nanoparticles have not been synthesized so far, is very large surface roughness of available so far magnetic-plasmonic nanostructures. Therefore, before deposition of the SiO_2 layer we are going to significantly reduce the roughness of the deposited layer of plasmonic metal (if succeeded, it will be the first example of the reconstruction of the layer of plasmonic metal deposited on magnetic core).