Abstract

Since the early 1980ies chemists and physicists spend a lot of effort to synthesis and characterize semiconductive nanoparticles. The advantages of these nanoparticles over conventional organic dyes are the possibility of broadband excitation and the size depended emission in combination with their photostability. So there is an enormous potential for these fluorescent particles in the investigation of biological processes. To reduce the absorption and the scattering by biological material the excitation as well as the fluorescence in a so called imaging window (700 – 1000 nm) is required. Commonly lead based nanoparticles are used as nearinfrared-emitter. But particles with a suitable bandgap are so small, that they are thermodynamically instable due to their high surface energies. By doping larger particles it is possible to synthesize stable particles with a shift of the emission wavelength towards smaller values.

Here we present the synthesis of cadmium doped lead selenide nanorods. The anisotropic shape of our system leads to an increase of absorption cross section and quantum yield. Using a hot injection approach for the synthesis of our lead selenide rods we are able to tune the aspect ratio between 1:2 and 1:6. In an additional reaction step we add a cadmium precursor to our lead selenide nanorods. By varying the amount of cadmium, temperature and reaction time we are able to blueshift the excitation and the emission and increase the quantum yield. In addition, first results for the transfer into an aqueous system using a copolymer will be presented.

Keywords: near infrared spectorscopy, optical window, lead selenide nanorods