

Nanostructure of different drug delivery systems

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Abstract

Different drug delivery systems e.g. liposomes, lipid emulsions, nanoparticles as well as model membranes were studied and their structures upto nanoscale will be presented. The techniques e.g. small angle x-ray scattering (SAXS) and grazing incidence x-ray scattering (GISAXS) from the synchrotron source are suitable for this purpose because this source can produce a highly intense and focus x-ray. The structure of drug delivery systems with only small amount of samples can be determined. Very comprehensive information is the result. The further useful technique to determine the nanostructure is the small angle neutron scattering (SANS). Because of the opportunity to vary the contrast, different regions of the sample can be observed. An example of SANS-results of the nanoparticles will be shown. However, these modern techniques can be performed only at the large scale facilities (synchrotron or neutron sources) e.g. Berlin Synchrotron Source (BESSY), Berlin/Germany, German Synchrotron Source (DESY), Hamburg/Germany, Hahn-Meitner-Institute (BENSC) Berlin/Germany, Heinz Maier-Leibnitz (FRM II), Munich/Germany, GKSS Research Center, Geesthacht/Germany. The experiments can be carried out at these institutes on basis of a particular permission applied for together with a respective proposal. These techniques are until now mostly used in the field of physic, biology and chemistry. The present study shows, however, that they are also useful as complementary techniques for pharmaceutical systems.