“Synthesis of monodisperse polymeric nanoparticles using microreactors”

Thursday, December 17
13:00 – 14:00
Seminar Room 115, Hallwachsstr. 3 (HAL)

The most commonly reported method for synthesizing chitosan nanoparticles is ionic gelation. In this method, chitosan precursors are cross-linked by slow addition of sodium tripolyphosphate (TPP), which yields large sized (100-300 nm) particles with a high degree of polydispersity. Even though factors (such as the concentration of reactants, temperature, pH, and the level of deacetylation) governing the size and dispersivity of chitosan nanoparticles are known, understanding the process at the mechanistic level, have remained elusive.

Here, we hypothesize that by using confined reaction volumes, preset temperatures and predefined reaction times, it should be possible to exert control over the kinetics of nanoparticles synthesis. This led to design and fabrication of a polydimethylsiloxane microreactor with magnetic micro needles for the synthesis of monodisperse chitosan nanoparticles. The well-controlled microreactor-based mixing generated monodisperse particles with tunable properties including antifungal drug entrapment, release rate, and effective activity against Candida.
Dr. Dhananjay Bodas studied Physics at The Maharaja Sayajirao University of Baroda from 1997-1999. He finished his Doctorate in Electronic science from the University of Pune in the year 2004 on the topic “Development of novel masking materials (polymers) for silicon micromachining” with Dr. SA Gangal.

After completing the doctorate, he was awarded the postdoctoral scholarship from the Defense ministry of France. He worked at the institute of FEMTO-ST/CNRS, Besançon from 2004-2006.

He received the prestigious scholarship from Alexander von Humboldt foundation in 2006 to work with Dr. Roland Zengerle and Dr. Jens Ducree at the Institute of Microsystem technique in Freiburg.

He returned back to India in end of 2007, worked for a company for a year before moving to academic research position in 2008. Currently he holds a Scientist position at the Centre for Nanobioscience at Agharkar Research Institute with keen interest to understand functional microfluidics when applied to life science.