



Polymers under Multiple Constraints

Kolloquium

Thursday,

9th January
2014

at: 5.15 pm

Gustav-Mie-
Hörsaal,
Theodor-Lieser-
Str. 9, 06120
Halle

*Coffee will be
served from
4.45 pm!*

Prof. Dieter Richter

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Polymer Dynamics in Nano Composites and under Confinement

After summarizing neutron spin echo (NSE) results on the polymer dynamics in non-interacting nano composites, I will present NSE investigations on polymers interacting attractively with nanoparticles or confining surfaces. Polyethylene-oxide (PEO) was filled with neat SiO₂ nanoparticles up to 15 vol%. Investigating a short chain matrix we realised that a fraction of chains is adsorbed at the nanoparticle surface suppressin its translational diffusion. Nevertheless these adsorbed chains undergo an unchanged segmental dynamics seemingly forming a micelle like corona of chains connected with their OH-end groups. Changing to methylene terminated chains the picture alters drastically now showing a tightly adsorbed layer that however is not glassy as often assumed but undergoes pico second local dynamics. These results are corroborated and extended in studying the dynamics of Polydimethylsiloxane (PDMS) confined in nano porous Alumina. There a partly anchored chain fraction is found that undergoes restricted Rouse motions with segmental mobilities as in the bulk phase. The size of this layer exceeds significantly the length scale of the directly adsorbed polymer, presenting a first direct microscopic evidence for the hypothetical interphase.

