Was ist weiche Materie ?

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What do we mean by soft matter? Americans prefer to call it "complex fluids". This is a rather ugly name, which tends to discourage the young students. But it does indeed bring in two of the major features:

I) Complexity. We may, in a certain primitive sense, say that modern biology has proceeded from studies on simple model systems (bacterias) to complex multicellular organisms (plants, invertebrates, vertebrates...). Simi-larly, from the explosion of atomic physics in the first half of this century, one of the outgrowths is soft matter, based on polymers, surfactants, liquid crystals, and also on colloidal grains.

2) Flexibility. I like to explain this through one early polymer experiment, which has been initiated by the Indians of the Amazon basin: they collected the sap from the hevea tree, put it on their foot, let it "dry" for a short time. And, behold, they have a *boot.* From a microscopic point of view, the starting point is a set of independent, flexible polymer chains. The oxygen from the air builds in a few bridges between the chains, and this brings in a spectacu-lar change: we shift from a liquid to a network structure which can resist tension - what we now call a *rubber* (in French: caoutchouc, a direct transcription of the Indian word). What is striking in this experiment, is the fact that a very mild chemical action has induced a drastic change in mechanical properties: a typical feature of soft matter.

Was ist Weiche Materie?

DIETER RICHTER Jülich

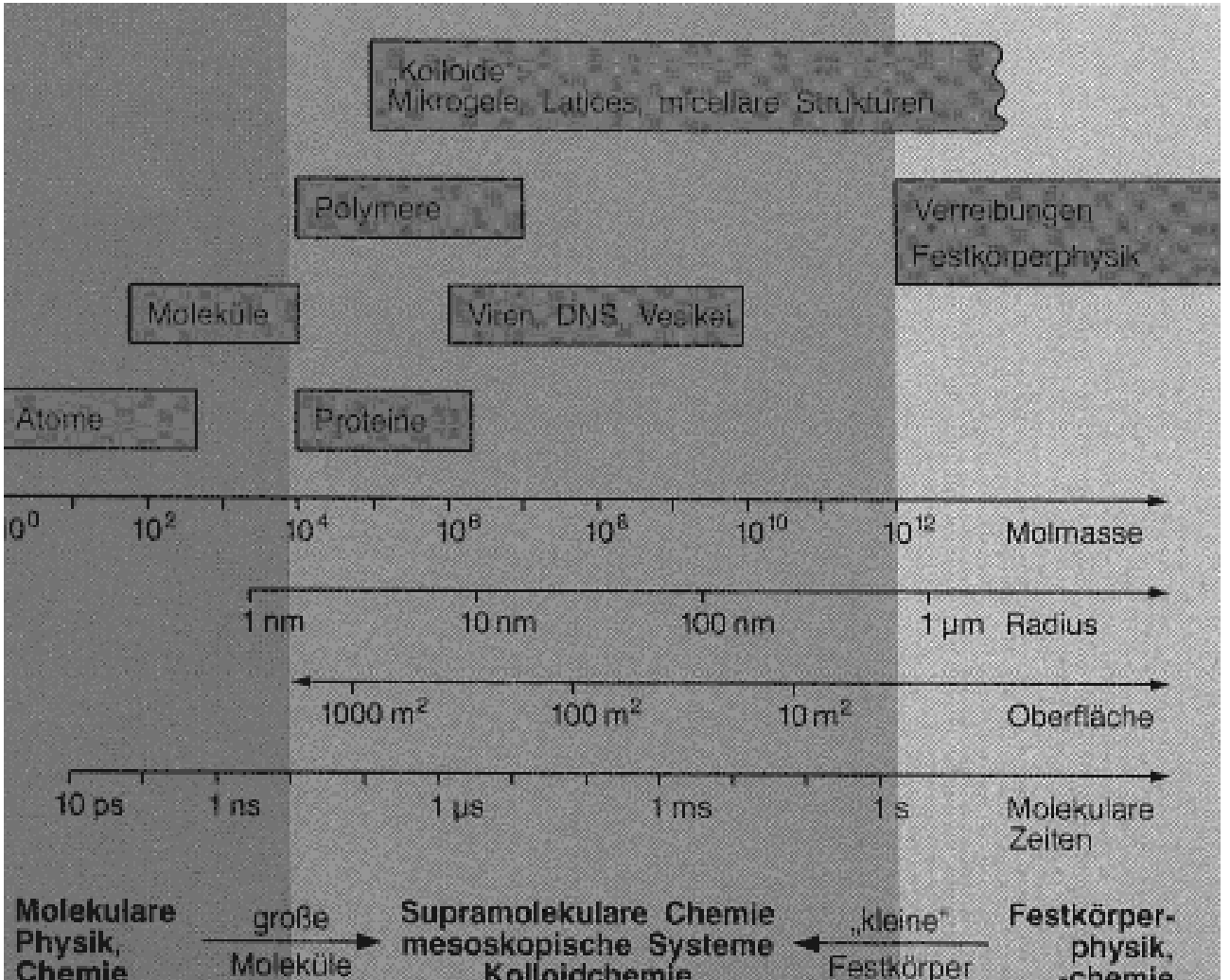
Komplexe Materialien auf mesoskopischer Skala

Weiche Materie ist komplex,ihr Zustand liegt zwischen fest und flüssig.So unterschiedlich Weiche-Materie-Systeme sind, sie haben Eines gemeinsam:Auf der mesoskopischen Skala – zwischen Nano-und Mikrometern – weisen sie Strukturen auf,die ihr Verhalten bestimmen.

Was ist Weiche Materie?

- ***Längenskalen: Nano- bis Mikrometer***
- ***Fluktuationen, Brownsche Bewegung***
- ***Sellbst“organisation“ (Self-assembly)***
- ***Fractale, Percolation***

Längen- und Zeitskalen



Materialien

- Flüssigkeiten
- Flüssigkristalle
- Polymere/Blockkopolymere
- Vesikel/Mizellen/Membrane
- Gele/Schäume/Elastomere
- Kolloide
- Biomaterialien

Anwendungen

- Kunststoffe
- Funktionsmaterialien
- Opto-Elektronik (Displays, LEDs,opt. Leiter)
- Bio- Materialien
- Tenside/Seifen
- Benetzung/Coating