

PHYSIKALISCHES KOLLOQUIUM

Mittwoch, den 27.10.2010, um 15:30 Uhr

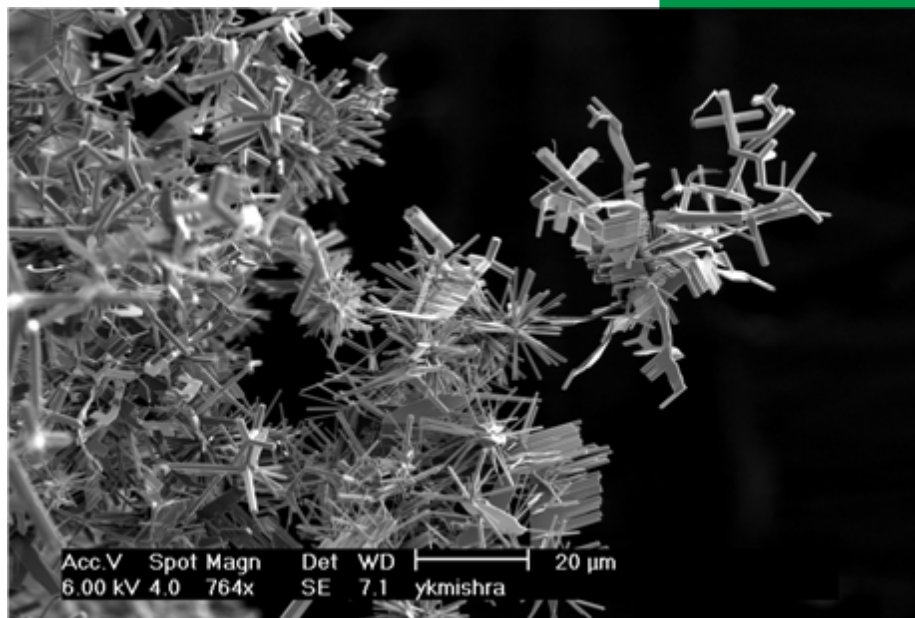
Ort: Reichenhainer Str. 90; Neues Hörsaalgebäude, Raum: 2/N013

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Putting the basic building nanostructured blocks together: flame transport synthesis

Designing a material that is elastic and can withstand high temperatures like 1300 K or more is a difficult task, as polymers tend to decompose already at lower temperatures and metals melt. Especially under ambient conditions, often oxygen creates a problem for metals at these temperatures. Therefore, the fabrication of a flexible inorganic and non metallic material is desired. If this material is at the same time a semiconductor, it has a high potential as a multifunctional material. Ceramic or classical semiconductors like III-V or II-VI type are high temperature stable, but typically brittle. This is different on the nanoscale. Even semiconductor wires like silicon with a very small diameter do not easily built up enough stress that leads to a failure while being bent, because in a first order approximation the maximum stress of a fiber scales with its diameter. In this presentation, we show a material and its synthesis, called "flame transport synthesis" of macroscopic expansion that is composed of interconnected nanoscale semiconducting basic building blocks that act collectively as an elastic material. In situ experiments inside a scanning electron microscope are carried out to show the elasticity with a manipulation needle. Examples of those novel materials that will be presented can consist of mixtures of interconnected nanoscale tetrapods, combs, tubes, wires and thus form network structures of extreme high complexity levels. Beside the materials science aspects, the materials offer interesting physics. First electrical semiconducting and sensor properties are presented. As interpenetration materials with PDMS, a wide range of tuneable surface energy can be achieved. These allow superhydrophilic as well as superhydrophobic properties. Those show the interesting effect of elastic water jet reflection which will be presented as well.



Alle Zuhörer sind ab 15:15 Uhr zum Kaffee vor dem Hörsaal eingeladen.