

How to convert a nano-powder into a nano-crystalline solid

Largely unnoticed by theoretical physics, the last 20 years have seen a revolution in nano-particle processing. One example is that powders - although very porous, when freshly produced - can be converted into a dense solid, which still keeps a microstructure at the nanoscale. The processes are new developments related to what traditionally was called "Spark Plasma Sintering", but has nothing to do with sparks and plasmas. Computer simulations predict intermediate steps of these processes and reveal the underlying mechanisms. I will give a review of recent simulations, and also discuss, how the classical concepts of sintering are modified, if the particles are very small.