



Lecture No. 53

**Czech Society for Mechanics
and Institute of Thermomechanics, CAS**

invite you to a lecture and discussion within
the lecture series **Institute of Thermomechanics Seminar**

Nanoparticle synthesis by spark discharge

given by

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The idea of nanoparticle synthesis in the gas phase is to first evaporate a solid material, e.g. by spark discharge, and second, to condense the vapor in a stream of carrier gas. As a result, solid nuclei are formed by homogeneous nucleation and the nuclei grow to sizes of several nanometers in diameter.

Nanoparticle synthesis in the gas phase is advantageous for certain applications. It is typically a continuous process that offers high purity of product nanomaterials, reduced waste formation, and straightforward scale-up possibilities. Cooling of the gaseous systems can be well controlled and therefore, the morphology and size distribution of the nanoparticles can be tailored to specific applications. Also, nanoalloys can be generated by this technique.

We constructed a spark discharge generator, which achieves nanoparticle production rate of tens of milligrams per hour. This production rate allows us to generate enough material for sample analysis, but also represents usable amounts of nanopowders for various applications. Our target application is the use of platinum-based nanomaterials as catalysts in hydrogen fuel cells. We synthesized nanoparticles from platinum, iridium, tungsten, and characterized the materials by TEM and XRD techniques.

**The lecture will be held on Wednesday, October 3, 2018 at 10:40 in the building
of the Institute of Thermomechanics (lecture room B), Dolejškova 5, 182 00 Prague 8**