Air Quality Measurements: New Manufacturing Method for Nano Gas Sensors Opens Doors

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Nano-sized gas sensors in mobile telephones that measure the atmospheric humidity are nothing new as such. However, so far it was necessary to rely on complex lithographic methods to produce the required nano-structure of the sensors, and they have the added disadvantage that they do not work well on uneven surfaces. A relatively new approach is the focussed electron beam deposition method -- FEBID for short -- in which the nano-structures can be "written directly" without requiring any pre- or after-treatment. Following the requisite fundamental research, application-oriented nano-structures have only been produced by FEBID recently on a trial basis.

Together with colleagues from the University of Graz [1], Harald Plank from the Institute of Electron Microscopy and Nanoanalysis at Graz University of Technology is one of the pioneers of this manufacturing method. The team developed the world's first FEBID based nanoscopic gas sensor.

Nano Sensors for All Applications

The so far unique nano sensor is not only exceptionally powerful and fast to manufacture, it also has great potential. The totally new manufacturing method also works on uneven surfaces -- and as the properties of nano-structures depend crucially on the material, this opens the door to completely new applications.

According to Plank, the team is now planning to functionalize nanoscopic surfaces with the aim of developing very specialized nano sensors that can be integrated in a mobile telephone and are capable of measuring not just the humidity of the air, but also the CO or sulphur content. This new type of nano gas sensor would be particularly interesting for environmentally relevant air quality measurements -- for instance for the measurement of exhaust fumes from motor vehicles. Even the measurement of toxic agents with mobile terminals is conceivable.

Finally, a huge advantage is that nano gas sensors manufactured by means of the new method can also be used in liquid environments. As Plank explains, this makes them fit for medical applications -- for instance the direct measurement of individual blood components.

For more information visit http://www.tugraz.at/ [1].

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