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Nanotube-based sensor between Vienna and the middle of the world

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The innovative nanotechnology for the energy and environment is much anticipated and has much impact on social design. Especially, the new environmental sensing technology is expected to be the most important application of the nanotechnology. The research on carbon nanotube sensors is almost as old as the discovery of single-walled (SW) CNTs but the major bottlenecks in this field remain unsolved because most studies have been published before the nanotube purification and separation according to metallic character were possible. In environmental sensing, this hinders the understanding of the reaction mechanisms of the sensed species because the overall behaviour of the nanotubes has constantly been masked by a response related to either a substrate or to impurities. This effect is not negligible and it obliges us to re-think the established sensing principles and to adopt different fabrication procedures. Overall, the capability to detect specific molecules (selectivity), the control of the response and recovery time (sensitivity), the reaction mechanisms and the actual fabrication of the sensing devices or structures to mediate sensing processes are still major challenges. On this presentation I will focus on showing our recent progress on establishing the prerequisites for studying the rich low-dimensional physics of pristine vs. doped SWCNTs using photoemission and X-ray absorption in order to use them as sensing objects.