

Beyond Adsorption: Exploring the *silent* aspect of carbon porosity

Teresa J. Bandosz

In this talk we would like to provide an insight into our perspectives on the new applications of nanoporous carbons that were inspired by the graphene features and its presence in these carbonaceous materials. A significant advancement to the “new” science of the “old” nanoporous carbons is in their application as photocatalysts for water splitting, as gas sensors and ORR and CO₂RR catalysts. In these applications both surface chemistry and porosity are crucial factors determining the specific performance. We will show an excellent gas sensing capability of carbons and their response selectivity. Photoactivity and electron transfer reactions will also be addressed. The mechanism of the observed processes based on an involvement of porosity will be proposed. Our inspiration in the science of graphene combined with the comprehensive knowledge of activated carbons surface chemistry, texture, morphology and adsorptive/reactive adsorptive properties directed us to look at carbons from another perspective; from the perspective of nanotechnology. The results obtained by us and briefly addressed here are very new and many questions have arisen, and are left unanswered, and many approaches need improvements. One has to take into consideration that explaining the complex phenomena on nanoporous carbons is not easy owing to the combination of the porosity and surface chemistry effects. Practically either one cannot exist without another and they add up to that's specific and unique synergy provided only by these materials. One thing is certainly true: “adventurous” graphene features can be found in nanoporous carbons and they deserve to be explored and used to their full extent.