ORAL 6

CARBON POLYMERS FULLY TAILORED TO ANY APPLICATION

Ana Arenillas*, M. Canal-Rodríguez, S.F. Villanueva, S.L. Flores-López, L.A. Ramírez-Montoya, M.A. Montes-Morán, J.A. Menéndez
INCAR-CSIC, Francisco Pintado Fe 26, 33011 Oviedo SPAIN

*corresponding author email: aapuente@incar.csic.es

Continuous technological developments have led to an increase in efforts to find new materials with improved properties. Carbon materials have extraordinary and probably the most versatile properties, but carbons from natural sources have certain disadvantages such as the presence of impurities content, variability between batches and the lack of control of their properties. Consequently, attention has now shifted to synthetic carbon materials, with a high purity, controllable chemistry and the possibility they offer of being able to design the final properties of the carbon material. Nevertheless, the fact cannot be ignored that these synthetic carbon materials need to be obtained by means of as quick, as simple and as low cost a process as possible, in order to reach the level of mass production and implementation. Of these synthetic carbon materials, polymers have attracted a lot of attention, in particular carbon gels, which are highly porous materials, composed of primary particles that are interconnected to create a three-dimensional network structure. These synthetic carbons can be mass produced in a quick and scalable process assisted by microwave heating. Adjusting the process (i.e. operation and chemical variables) the polymeric network may be designed and thus the porous properties may be tuned in the whole range of porosity, from micro to meso or macropores. The materials obtained may be also submitted to different post-synthesis processes to increase their microporosity or to develop ordered structures to increase the graphitic character of the material. On the other hand, the chemistry may also be controlled by varying the type of monomers used, incorporating additives to the precursor solution and avoiding the presence of undesirable impurities. Finally, these polymeric materials can be also produced directly with the desired shape (i.e. monoliths, spheres, powders) without the need for binders. In sum, these materials exhibit extraordinary potential as they can be totally tailored to any final application in terms of porosity, structural order, chemistry and even the final shape.

Acknowlegements

The authors gratefully acknowledge the financial support received from the Ministerio de Economía, Industria y Competitividad from Spain (Project CTQ2017-87820-R) and Principado de Asturias–FICYT-FEDER (Project PCTI-Asturias IDI/2018/000118).

References

[1] N. Rey-Raap, J.A. Menéndez, A. Arenillas. *Carbon*. **2014**, 78, 490-499
[2] M. Canal-Rodríguez, A. Arenillas, N. Rey-Raap, G. Ramos-Fernández, I. Martín-Gullón, J.A. Menéndez. *Carbon*. **2017**, 118, 291-298