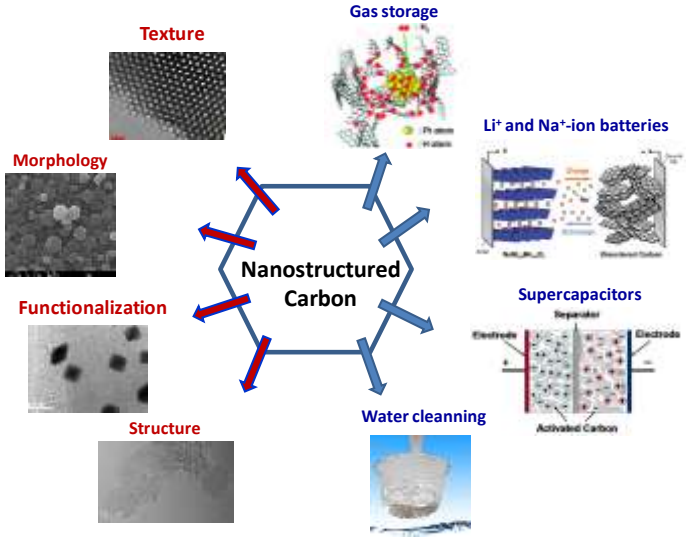
Sustainable carbon materials with tuned characteristics for energy storage applications

Camelia Matei Ghimbeu*

Institut de Science des Matériaux de Mulhouse, CNRS UMR 7361, 15 rue Jean Starcky, 68057 Mulhouse, France

*camelia.ghimbeu@uha.fr

Carbon materials are widely used in many fields of applications and their performances are closely related to their features (texture, structure, surface chemistry and morphology). Novel eco-friendly synthesis approaches have been developed to obtain microporous, mesoporous and hierarchical carbons using green chemistry aspects and their synthesis mechanisms studied [1-3]. The control of pore size, specific surface area, surface chemistry and carbon defects are finely tuned by in-situ or ex-situ techniques allowing to obtain carbon materials with well controlled charateristics and several correlations between the the carbon features and their performances as electrodes in batteries and supercapacitors could be so far established [4-6]. Fonctionalized carbon with metallic-based nanoparticles gives rise to novel materials able to exhibit synergetic effects and improved performances. Effects of NPs size and confinement in the carbon framework are particulary studied for hydrogen absorption and batteries applications. Downsizing the particles significantly change the hydrogen absorption behavior [7] while their confinement prevent particle agglomeration during their synthesis and increase the cycling life in a battery [8].



[1] C. Matei Ghimbeu, Green Chemistry 16 (2014) 3079

[2] A Maetz, L Delmotte, G Moussa, J Dentzer, C Matei Ghimbeu, Green Chemistry 19 (2017) 2266

[3] C Matei Ghimbeu, V Luchnikov, Micro Mesoporous Materials (2017), Submitted

[4] G. Moussa, C Matei Ghimbeu, PL Taberna, P Simon, C Vix-Guterl, Carbon 105 (2016) 268

[5] C Decaux, C Matei Ghimbeu, F Beguin, C Vix-Guterl, E Raymundo, J Power Sources 263 (2014) 130

[6] B Zhang, C Matei Ghimbeu, C Vix-Guterl, JM Tarascon, Adv Energ Mater 16 (2016) 61501588

[7] C Matei Ghimbeu, C Zlotea, R Gadiou, J Mater Chem 21 (2011) 17765

[8] A Jahel, C Matei Ghimbeu, C. Vix-Guterl, L Monconduit, Adv Energ Mater 4 (2014) 1400025