Poly(ionic liquid)-chitosan aerogels for environmental applications

Raquel V. Barrulas[1*], Clara López-Iglesias[2], Marcileia Zanatta[1], Teresa Casimiro[3], Carlos A. García-González[2] and Marta C. Corvo[1]

[1]*i3N|Cenimat, Department of Materials Science, NOVA School of Science and Technology, NOVA University Lisbon, 2829-516 Caparica, Portugal*
[2]*Department of Pharmacology, Pharmacy and Pharmaceutical Technology, I+D Farma group (GI-1645), Faculty of Pharmacy and Health Research Institute of Santiago de Compostela (IDIS), Universidade de Santiago de Compostela, E-15782 Santiago de Compostela, Spain*
[3]*LAQV-REQUIMTE, Department of Chemistry, NOVA School of Science and Technology, NOVA University Lisbon, 2829-516 Caparica, Portugal*
**e-mail: r.barrulas@campus.fct.unl.pt*

Climate change mitigation depends on the development of novel materials that work simultaneously as CO_2 sorbents and catalysts. The existing strategies for CO_2 capture (CC), such as aqueous amine solvent scrubbing, have several problems – solvent loss through evaporation, formation of corrosive by-products, and high energy consumption. [1]

Ionic liquids (ILs) are salts with organic cations combined with organic or inorganic anions, whose properties are tuneable towards the applications through structural changes. ILs have been on the spotlight for applications such as gas storage, separation, and catalysis. Namely, poly(ionic liquid)s (PILs) combine the unique characteristics of ILs with a macromolecular framework.[2] Aerogels are light-weight nanostructured materials with high porosity and specific surface area. For this reason, silica-based aerogels are already being used for CC.[3] Furthermore, aerogels can be obtained from biopolymers such as chitosan, which besides being biocompatible and biodegradable, uses a biomass residue as starting material.[4] The combination of chitosan-based aerogels with PILs is expected to enhance CO_2 diffusion through the material, efficiency and selectivity.[2] This work reveals, for the first time, promising PIL-chitosan composite aerogel beads (*AEROPILs*) for CO_2 capture and conversion.

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