

Spectroscopic Characterization of Molecular Materials

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The Spectroscopic Characterization of Molecular Materials group is oriented to international collaborations, especially with European and Asian institutions. Materials under study are related to renewable energies and green economy. Physical-chemical properties of electro and/or photoactive molecular systems are investigated to suggest innovative devices.

Researches are carried out using magnetic, optical and thermal spectroscopies, at advanced level: NMR, EPR, UV-NIR-Raman, TGA spectroscopy. Main research topics include: (1) investigations on charge and energy transfer processes; (2) characterization of structure and dynamics of chemical species, stable and/or short-lived, excited and in ground state, interacting and isolated; (3) studies of interfacial and bulk conductivity mechanisms, spin dynamics, dipolar interactions.

- *Mixing in Biogas Digesters and Development of an Artificial Substrate for Laboratory-Scale Mixing Optimization*, Chem. Eng. Technol., **2017**, 40, 238-247.
- *Model-based assessment of partially upgraded biogas and the decentralized utilization for mobility in agriculture*, ISBN:978-88-89407-17-2, **2017**, 1358-1361.
- *Electric Response and Conductivity Mechanism in H₃PO₄-Doped Polybenzimidazole-4N-HfO₂ Nanocomposite Membranes for High Temperature Fuel Cells*, Electrochimica Acta, **2017**, 228, 562-574.
- *Thermogravimetric investigation on the interaction of formic acid with solder joint materials*, New J. Chem., **2016**, 40, 10482-10487.
- *Phase diagram approach to study acid and water uptake of polybenzimidazole-type membranes for fuel cells*, ECS Trans., **2016**, 72, 157-167.