

Colóquio dos Centros de Física e de Química da Universidade do Minho

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Fluoropolymers as Unique and Irreplaceable Materials

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Resumo:

Fluoropolymers are niche macromolecules that possess variable morphologies (ranging from thermoplastics to elastomers, thermoplastic elastomers). Their exceptional properties mainly arise from the high electronegativity of the fluorine atom, from the small Van der Waals radius (1.32 Å) that induce a strong and short C-F bond (the dissociation energy of which is 485 kJ.mol⁻¹) and a low polarizability. Hence, fluorinated plastics that contain a high percentage of fluorine exhibit unique combination of properties such as very high thermal, chemical, aging and weather resistances, a high chemical inertness (to solvents, hydrocarbons, acids, and bases), low surface energies (as evidenced by repellent effect to oils and water), low dielectric constants, refraction indices, dissipation factors, flammability, and moisture absorption. Moreover, the presence of the strong C-F chemical bond has a crucial impact onto the high resistance to oxidation and hydrolytic stability.

This presentation aims at showing the advantages and also few issues of these fascinating materials, especially on recent regulations related to per(poly)fluoroalkyl substances for which fluoropolymers should be excluded from

About the Speaker:

His main interests focus on the synthesis and the characterization of fluorinated monomers (including cure site monomers and telechelics), telomers, and copolymers for various applications such as F-surfactants, elastomers, coatings, and polymers related to energy (fuel cell membranes, polymer gel electrolytes for Li-ions batteries and PV). Coauthor of 3 books, 40 reviews or chapters of books, 300 peer review publications and coinventor of more than 70 patents, he is also a member of the American and French Chemical Societies and is a member of the Editorial Boards of the Journal of Fluorine Chemistry, European Polymer Journal, Polymer Bulletin