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Use of the circular economy to obtain siliceous materials from citrus waste

Abstract:

The lack of natural resources on our planet due to the indiscriminate use of agricultural sources through the manufacture of various materials has contributed to the increase of a generation of pollutants with effects on health that represent an important socio-environmental risk. The circular economic is a holistic philosophy used to manage and preserve resources through recovery and reuse (circularity). It outlines ways to eliminate waste, transform biodegradable and non-biodegradable waste, and promote reuse and recycling. There are different forms of circularity, with the 9R model being the optimal application: Refuse, Rethink, Reduce, Reuse, Repair, Restore, Remanufacture, Reuse, Recycle and Recover. The incorporation of citrus residues into a solid silica matrix carried out by the sol-gel synthesis method has been investigated. The diverse chemical functionality and organic acids present in the system allow us to obtain porous materials with a potential application in catalysis. Sol-gel method opened a new synthesis system that is carried out at room temperature, since it allows the control of a material obtained from pure liquid precursors, so that it meets the necessary features to be used as a selective membrane. In the context of this work, solids are synthesized whose active phase is formed by silicon oxide that interacts with biowaste specifically from citrus fruits (lemon, orange and tangerine), applying it as raw material. Different parts of these fruits are used (peel, pulp and juice). This proposal made contributions to areas of materials science and ecological synthesis systems, finding, at the same time, an interaction between the biomolecules that are present in citrus fruits.

Biography

Patricia Vazquez currently serves as an Associate Professor in Faculty of Sciences Exactas, University of La Plata and Principal Researcher of CONICET (Argentina). She has published more than 110 journal articles (h-index is 28), 10 book chapters and 3 academic books throughout in 30-year career in CONICET including IUPAC titular member of Green Chemistry Commission. More than thirty research grants (international and national) were secured and utilized to support her team's research activities: Nanoparticles, Biomaterials and Advanced Materials for Catalysts. Recently. She is the pioneer on Circular Economy in Argentina. She has received ten national awards for her research outputs.