XXI Brazilian Meeting on Inorganic Chemistry
X Brazilian Meeting on Rare Earths
III Workshop on Theoretical Bioinorganic Chemistry
Belo Horizonte, September 12 - 15th 2024

Layered Double Hydroxide nanotubes (LDHs) doped for enhanced photocatalysis

Alexandre Teixeira [1]; Alysson Morais[2] and Danilo Mustafa

[1]Department of materials and mechanics, University of São Paulo - USP, São Paulo, Brazil
[2] Center for Surface Chemistry and Catalysis, KU Leuven B-3001, Leuven, Belgium
E-mail: alexandre.candido.teixeira@usp.br

Thematic Area: Catalysis

Keywords: photocatalysis, structure, CO_2

Carbon dioxide (CO_2) is crucial for life, released naturally by respiration and decomposition. Since the Industrial Revolution in the late 18th century, CO_2 emissions have surged beyond acceptable limits, prompting many countries to invest heavily in reducing these emissions.
The structure of layered double hydroxides (LDH) is based on the sheet mineral brucite (MgO). Isomorphic substitution of divalent ions in the neutral brucite sheet with tri- or tetravalent ions creates a positive layer charge, which can be balanced by the adsorption of anions between the layers. LDH nanotubes have a large surface area, and the replacement of metals in the LDH layers with metals possessing photocatalytic properties, such as copper, enables potential applications in CO_2 reduction. HDL nanotubes have a large surface area (figure 1), and the replacement of metals in the HDL layers with metals such as copper increases the surface area and also allows for potential applications in CO_2 reduction.

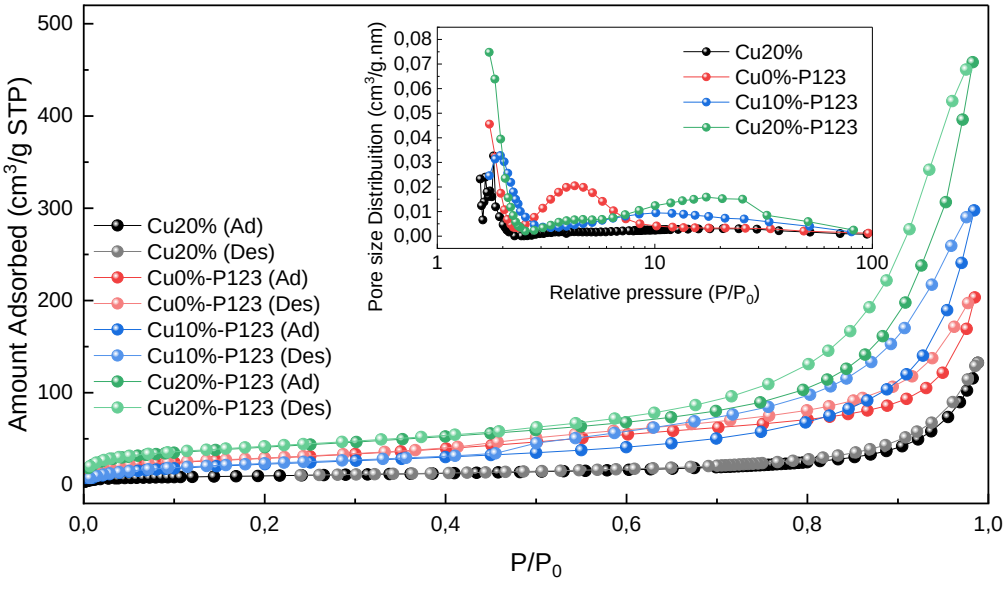

Figure 4 Nitrogen adsorption-desorption isotherms and corresponding pore size distribution plots.

Acknowledgments: Fundação de Amparo à Pesquisa do Estado de São Paulo (2022/01314-8)

References

[1] K. Rennert *et al. Nature*, vol. 610, no. 7933, pp. 687–692, Oct. 2022
[2] A. F. Morais *et al. Nanoscale*, vol. 13, no. 27, pp. 11781–11792, 2021
[3] M. Lv and H. *Solid State Chem*, vol. 227, pp. 232–238, Jul. 2015