

Preparation of materials to carbon dioxide capture using supercritical antisolvent process

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The need of strategies to capture and store carbon dioxide are greater as the time goes by. There are some solutions provided in the literature to capture this gas[1]. An appropriate alternative is Calcium Looping technology that use calcium oxide[2]. This material can be obtained from the calcination of different materials like eggshells, marble residues or any material constituted mainly by calcium carbonate. Nowadays it is known the importance of the physical structure of the material and the size. An interesting technique that is capable of produce solid materials with a homogeneous morphology and the ability to tune the particle size and particle size distribution of the material is Supercritical Antisolvent Precipitation (SAS)[3]. Nobre et al (2019) have already successfully micronized calcium acetate produce previously from eggshells using SAS process[4]. The aim of this work is to produce calcium acetate, using SAS as a precursor to calcium oxide, from different sources. The products obtained will be characterized by SEM analysis, FTIR spectroscopy and its surface areas, as well as its capacity for dioxide capture.

ACKNOWLEDGEMENTS

Luis C. S. Nobre thanks FCT (Fundação para a Ciência e Tecnologia – Portugal) for the PhD grant (ref. PD/BD/133309/2017) and the financial support from UIDP/00100/2020

- [1] E.I. Koytsoumpa, C. Bergins, E. Kakaras, The CO₂ economy: Review of CO₂ capture and reuse technologies, *J. Supercrit. Fluids.* 132 (2018) 3–16. doi:10.1016/J.SUPFLU.2017.07.029.
- [2] T. Witoon, Characterization of calcium oxide derived from waste eggshell and its application as CO₂ sorbent, *Ceram. Int.* 37 (2011) 3291–3298. doi:10.1016/J.CERAMINT.2011.05.125.
- [3] E. Reverchon, R. Adami, Nanomaterials and supercritical fluids, *J. Supercrit. Fluids.* 37 (2006) 1–22. doi:10.1016/j.supflu.2005.08.003.
- [4] L.C.S. Nobre, S. Santos, A.M.F. Palavra, M.J.F. Calvete, C.A. Nieto de Castro, B.P. Nobre, Micronization of Calcium Acetate: an effective way to produce quality catalysts by Supercritical Antisolvent Precipitation., in: 17th Eur. Meet. Supercrit. Fluids, B. Abstr., 2019: pp. 193–194.