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Study of the effect of ball milling parameters on defect introduction in h-BN for heterogeneous catalytic applications FERNAND TORRES-DAVILA, Department of Physics, University of Central Florida, Orlando, FL, 32816, YI DING, Department of Materials Science and Engineering, University of Cent, KATERINA CHAGOYA, Department of Mechanical and Aerospace Engineering, University of Central Florida, Orlando, FL, 32816, ALAN FELIX, DAVID NASH, RICHARD BLAIR, Florida Space Institute, University of Central Florida, Orlando, FL, 32816, LAURENE TETARD, NanoScience Technology Center, University of Central Florida, Orlando, FL, 32826 — The quest for a new generation of metal-free heterogeneous catalysts as alternatives to noble metals for CO2 capture and conversion to added-value products has recently gained traction. It was previously shown that defect-laden hexagonal Boron Nitride (dh-BN) becomes reactive for hydrogenation reactions, where defects such as boron or nitrogen vacancies or edges, are considered to play a key role. However, the study of process-structure-catalytic property relationships to determine optimal conditions for economical and effective implementation of these catalysts remains incomplete. In this study, we consider ball milling as a method to produce dh-BN and monitored the effect of milling parameters on the efficiency of the catalyst in terms of reagent gas molecule uptake on the flakes. We compare the effect of milling duration, material, and ball dimensions on the resulting catalytic performance. Morphological and structural properties are considered to identify the optimal conditions. Lastly, using the fluorescent properties of dh-BN exposed to air, we estimate the density of the defect introduced in the flakes during milling. We highlight some critical conditions that guide the performance of the material for catalytic functions.

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