

In Situ TEM Observation of Carbon Dioxide Capture on K,Li-NO₃-Promoted Magnesium Oxide

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In this work, we present the in situ transmission electron microscopy (in situ TEM) studies of the CO₂ capture phenomenon on a KNO₃-LiNO₃ eutectic mixture (EM)-promoted MgO sample (KLM). Results revealed that the EM undergoes irreversible structural rearrangement during sorption, resulting in the evolution of cloudy structures that stay finely distributed after regeneration. From this, we derived a nucleation and structural rearrangement scheme for MgCO₃ and EM, which involves the rearrangement of bulk EM to evenly distributed EM clusters due to MgCO₃ saturation as sorption proceeds. We also conducted studies on the interface between EM over solid MgO and MgCO₃ formed during sorption, which further clarifies the interaction between MgO and EM. This work was supported by the Energy Efficiency & Resources (No. 20163010092210) of the Korea Institute of Energy Technology Evaluation and Planning (KETEP) grant funded by the Korea government Ministry of Trade, Industry & Energy.