

Comparative study of CO₂ adsorption ability and catalytic performance in electrochemical reaction of single La₂O₂CO₃ phase

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The different single crystal La₂O₂CO₃ phases are one of key parameters influencing heterogeneous catalytic behavior of La₂O₃-containing catalysts. In this study, we prepared single crystal La₂O₂CO₃ materials by two different methods – precipitation method (PL) and hydrothermal method (HL) and comparatively investigated the formation of La₂O₂CO₃ phases in the prepared materials. The factors to different La₂O₂CO₃ phase were investigated. The intermediate product before calcination process played an important role in the formation of La₂O₂CO₃ phase. The La(OH)₃ resulted in hexagonal phase while LaOHCO₃ resulted in monoclinic phase. The CO₂ was desorbed from the monoclinic La₂O₂CO₃ phase at the higher temperatures than the hexagonal La₂O₂CO₃ phase. Also, by quantity analysis of TPD, monoclinic La₂O₂CO₃ phase has about three times amount of CO₂ adsorption than the hexagonal La₂O₂CO₃ phase which prove that the monoclinic La₂O₂CO₃ phase has better CO₂ adsorption ability. According to the CV result, the monoclinic La₂O₂CO₃ phase has better catalytic performance in CO₂ electrochemical reaction.