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Celgard Membrane-mediated Ion Diffusion for Synthesizing Hierarchical Co(OH)₂ Nanostructures for Electrochemical Applications

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Abstract: It remains a challenge to develop simple and mild strategies for synthesizing various Co(OH)₂ nanostructures on substrates. Inspired by semipermeable membranes, a Celgard membrane was used as an interface for separating components of the precursor solution and for ion exchange, to construct hierarchical Co(OH)₂ nanostructures. In contrast to traditional solvothermal reactions, this Celgard membrane-based method is simple and effective for preparing high-loading Co(OH)₂ array (density of approximately 7 mg cm⁻²) on Ni foam. The permeability of the Celgard membrane was affected by the presence of an organic solvent. The morphology of Co(OH)₂ could be adjusted by controlling the OH⁻ diffusion rate across the Celgard membrane. OH⁻ was formed via the hydrolysis of

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