In situ exsolved Fe nanoparticles on Ruddlesden Popper structure as a cathode for SOECs

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CO2 conversion to useful material is an attractive way to reduce global greenhouse effects. In recent years, electrochemical reduction of CO2 in SOECs (Solid Oxide Electrolysis Cells) has attracted considerable attention as a conversion system because of their high efficiency. We report highly active Ruddlesden popper material La1.2Sr0.8Mn0.4Fe0.6O4 (RPLSMF) with exsolved Fe nanoparticles prepared from La0.6Sr0.4Mn0.2Fe0.8O3 (LSMF) by in situ annealing in flowing with H2 at operation temperature of SOEC. Doping Mn in B site and relatively low synthesis temperature of RP structure prevent formation of La2O3. The RPLSMF with Fe nanoparticles shows high current density at 1.3 V and temperature of 850 ℃. In addition, it shows excellent coke resistance as observed by galvanostatic stability test, indicating promising cathode material for CO2 electrolysis.