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## Morphological properties

The SEM images of the fractured cross-sectional view of pure CCO,  $Cd_{x=0.5}$  and  $Cd_{x=0.02}$  are shown in Figure S1- a, b and c, respectively. In figure a, the inset shows a lamellar-like grain structure after SPS. For all the pure and Cd-doped specimens, the dense bulks with lamellar structure were observed. There was no obvious difference visible for lamellar grains of pure and Cd-doped specimens.

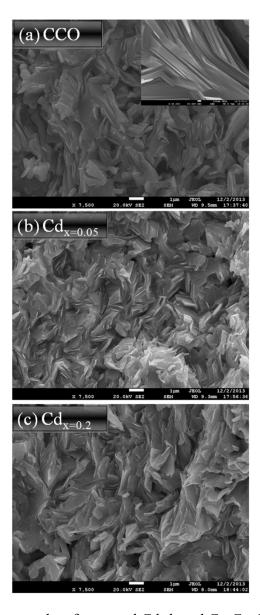


Figure S1: Typical SEM micrographs of pure and Cd-doped Ca<sub>3</sub>Co<sub>4</sub>O<sub>9</sub> ceramics