

Synthesis of Ni-poor NiO nanoparticles for DSSC-p applications

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Over the last decade, p-type semiconductors (SC) have known a renewed interest. Indeed these materials may have potential applications for light-emitting diodes, transistors, solar cells, etc. Since the achievement of the first Dye Sensitized Solar Cells by Grätzel ^[1] in 1991 a new generation of solar cells has been developed ^[2] where the n-type SC is replaced by a p-type one. This leads to the photo-injection of holes instead of electrons in the circuit. To date nickel oxide (NiO) is the reference p-type semiconductor. However yields are still far from those of DSSC-n and many studies aim to replace NiO by other systems such as CuAlO₂, CuGaO₂, CuCrO₂ or NiCo₂O₄ nanoparticles. Following our recent synthesis of N doped ZnO with stabilization of p-type charge carriers ^[3], we focus now on the preparation of N doped NiO nanoparticles to improve the p-type conductivity of NiO. We study here the chemical reactivity of a nickel oxyhydroxide precursor under air and ammonia that conducts to nanostructured Ni-poor NiO.

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