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

Baptiste Polteau1, Franck Tessier1, François Cheviré1, Stéphane Jobic2, Laurent Cario2, Fabrice Odobel3

1Institut des Sciences Chimiques de Rennes, Université de Rennes 1, France
2Institut des Matériaux Jean Rouxel, Université de Nantes, France
3CEISAM, Université de Nantes, France

E-mail: baptiste.polteau@univ-rennes1.fr

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.

Baptiste POLTEAU
PhD student
Institut des Sciences Chimiques de Rennes
Université de Rennes 1
Campus de Beaulieu, 35042, Rennes, France
+3322336256
baptiste.polteau@univ-rennes1.fr

Education
2013-2016 PhD, Chemistry, Université de Rennes 1
2012 Master degree in Solid State Chemistry and Materials, Université de Rennes 1

Fields of Research
Oxide/Nitride
P-type semiconductors
Nanoparticles
DSSC