Synthesis and characterization of iron-cobalt (FeCo) alloy nanoparticles supported on carbon

Iron-cobalt nanocrystalline bimetallic alloys supported on carbon microparticles were synthesized and characterized. The preparation methods involved the use of iron and cobalt chloride or acetate precursor salts in water and direct co-precipitation or wet impregnation techniques. The size of the alloy nanoparticles differed depending on the preparation method. When the wet impregnation technique of acetate precursor salts of Fe and Co were used for the synthesis, the size of FeCo alloy nanoparticles was approximately 13 nm. FeCo alloy nanoparticles were characterized by crystallography (XRD), thermogravimetric analysis (TGA), electron microscopy, energy dispersive X-ray spectroscopy analysis (EDX), and atomic force microscopy (AFM). In all cases, we observed well-dispersed nanometer size alloy particles on the surface of carbon microparticles. FeCo supported on such carbon microparticles are chemically and mechanically stable for prolonged periods of time. AFM analysis showed that the FeCo nanoparticles were formed on the surface of the carrier. The results of this study suggest that using these easy and inexpensive synthetic methods iron-cobalt nanoparticles can be formed on carbon microparticles support materials with applications in catalysis, microelectronics, and biomedicine.

General information
State: Published
Organisations: Department of Chemistry, Centre for Catalysis and Sustainable Chemistry, Organic Chemistry, Technical University of Denmark
Contributors: Koutsopoulos, S., Barfod, R., Eriksen, K. M., Fehrmann, R.
Pages: 1210-1216
Publication date: 2017
Peer-reviewed: Yes

Publication information
Journal: Journal of Alloys and Compounds
Volume: 725
ISSN (Print): 0925-8388
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 3.66 SJR 1.02 SNIP 1.403
Web of Science (2017): Impact factor 3.779
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.05 SJR 0.954 SNIP 1.332
Web of Science (2016): Impact factor 3.133
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 3.03 SJR 0.957 SNIP 1.398
Web of Science (2015): Impact factor 3.014
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 3.13 SJR 1.117 SNIP 1.632
Web of Science (2014): Impact factor 2.999
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.73 SJR 1.059 SNIP 1.583
Web of Science (2013): Impact factor 2.726
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.43 SJR 1.246 SNIP 1.57
Web of Science (2012): Impact factor 2.39
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes