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Synthesis and characterization of nano-crystalline tungsten carbide supported platinum for gas diffusion electrode catalyst

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A high active catalyst for gas diffusion electrode of Li-air fuel cell was prepared from nano-crystalline powder mixture of tungsten carbide and platinum. The WC nanoparticles were made with a low-temperature combustion synthesis-carbonization process. WC/Pt mixture was obtained by adding H_2PtCl_6 solution and sodium borohydride solution into a deionized water dispersed with WC powder. The WC/Pt mixtures are characterized by XRD, FESEM and EDS. The electrochemical catalytic activity of WC/Pt electrode is characterized by cyclic voltammetry (CV) in alkaline medium. FESEM analysis shows that the WC/Pt catalyst is composed of well-dispersed nanometer Pt clusters and WC nanoparticles. CV measurement indicates that WC/Pt as electro-catalyst for oxygen reduction reaction (ORR) shows high activity and exhibits a synergetic effect compared with that of either WC or Pt individually.

Biography

Xuanhui Qu is the Cheung Kong Scholars Program Professor in Materials at University of Science and Technology Beijing. He obtained his PhD degrees in Materials Science and Engineering from Central South University in 1992. Now he is the standing committee member of Chinese Materials Research Society and the President of Powder Metallurgy Branch of Chinese Society for Metals. His publication list exceeds 380 articles covering advanced materials and processing. He has co-authored 4 books and got over 70 patents. His research and teaching focus is on powder metallurgy and particular materials.

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Synthesis of isoindoline and dihydrophthalazine derivatives as biologically potent heterocyclic dye materials

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In this study, a series of aryl, heteryl hydrazonopyrazolyl isoindoline and dihydrophthalazine dyes have been efficiently synthesized in excellent yields via one-pot, multicomponent approach. Reaction of phenyl-hydrazono-1,3-dicarbonyls with thiosemicarbazide/ thiosemicarbohydrazide and phthalic anhydride in ethanol / NaOAc under reflux conditions afforded the corresponding isoindoline and dihydrophthalazine derivatives in excellent yields. The structures of all the newly synthesized compounds were confirmed by UV-vis, FT-IR, ^{1}H-NMR spectroscopic techniques and elemental analysis. *In vitro* antibacterial activity was evaluated and compared with standard drug kanamycin by using disc-diffusion method. Among all the screened compounds few compounds in the series have shown good antibacterial activity against both gram-positive and gram-negative bacterial strains.

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