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Nanostructured Organometallic Polymers for Enzymatic Bioenergy MOON JEONG PARK, JUNGPHIL LEE, Department of Chemistry, Division of Advanced Materials Science (WCU), Pohang University of Science and Technology (POSTECH) — The development of efficient enzymatic biofuel cell is a subject of considerable studies in past decades for potential applications such as biomedical devices and microchip systems. One of the key challenges in advancing the technology lies in the power densities of the system. Limitations have been arisen from the buried redox active sites within enzyme structure and poor interplay between redox reactions. In present study, a glucose oxidase is employed as a model enzyme and ferrocene-containing organometallic block copolymers are chosen for the electron mediators. Wiring of glucose oxidase into electrode surface was successfully achieved by cross-linked networks of organometallic polymers and remarkably, catalytic current densities of the fabricated electrodes have proven be a sensitive function of the morphologies of electron mediators. Different nanoscale morphologies, i.e., bicontinous structure, nanowires, and nanoparticles, have been derived and the use of bicontinous morphology confirms 2-50 times improved catalytic current response than the values obtained from other morphologies. The bio-sensing ability of the fabricated electrode with structural optimization was also exploited and good sensitivity is obtained at the physiological concentration of glucose in blood.

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