

High-throughput screening of combinatorial array for ternary metal alloy catalysts for oxygen electro-reduction

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A series of Pd based catalysts for proton exchange membrane fuel cell (PEMFC) and direct methanol fuel cell (DMFC) have been evaluated towards oxygen reduction, by high-throughput optical screening and combinatorial half-cell test. Fluorescein was first used as pH indicator for detecting pH change of the electrolyte in the vicinity of cathode caused by oxygen reduction. Arrays of catalyst spots comprised of binary, ternary Pd-alloy catalysts were prepared. Not only the analysis of fluorescence images, but the results organized from combinatorial half-cell test also exhibit high activities of these Pd-based catalysts. Moreover, acceptable stability of these catalysts at high potential in acidic environment suits them to the requirements of a cathode catalyst in PEMFC or DMFC.