

Project Title: Synthesis of 1,4-Butanediol by Reductive Coupling of Ethylene Halohydrins Using a Novel Dicobalt Complex

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Project summary: 1,4-Butanediol is an important precursor for the commercial production of tetrahydrofuran and poly(butylene terephthalate). There has been interest in the electroreductive coupling of ethylene halohydrins (2-haloethanols) as a synthetic route to the diol. However, for all the reported methods, the reaction yield is usually less than 40% at room temperature. In this study, a novel dicobalt complex containing two salen units is synthesized and used as the catalyst to make 1,4-butanediol by electrochemical reduction of ethylene halohydrins. The product yield is expected to be improved dramatically and its dependence upon the distance between the two cobalt centers in the complex will also be examined. Potentially, the method can be employed to synthesize dimeric compounds from various organic halides and this kind of application will be further studied.