437e Recovery of Asymmetric Homogeneous Catalysts Using CO2

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Asymmetric catalysts, both organometallic and enzymatic, are an important component of pharmaceutical processing. However, these catalysts are usually expensive and toxic and their recovery from product streams is crucial. Our approach involves designing solvent systems whereby a reversible stimulus induces a phase change enabling easy recover of homogeneous catalysts. The purpose is to preserve the high enantioselective activity of homogeneous catalysts while taking advantage of simple separation techniques, such as filtering and extraction, normally applied to heterogeneous or biphasic catalytic systems. Specific examples include the application of gaseous CO2 as a benign agent in gas-expanded liquids to induce catalytic recycle of water/organic, fluorous/organic, liquid polymer/organic and solid/liquid biphasic systems. The efficiency of catalyst recovery and recycle is detailed.