S27-1 Enzyme- Metal Combo Catalysis for Multi-step One-pot Synthesis

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We present herein a novel concept for the dynamic kinetic resolution (DKR) of racemic allyl alcohols by the combined use of lipases and oxovanadates. In this system, the lipase catalyzes the kinetic resolution of the racemic alcohols, while the vanadate causes the racemization of optically active alcohols that are generated during the above-mentioned resolution. These two completely different reactions take place simultaneously in a single flask to give optically active allyl acetates with high optical and chemical yields. The obvious features of this method comparing with the standard DKR are that the vanadate generates a dynamic equilibrium between several isomers of the allyl alcohols with causing the racemization and that the lipase performs a chemo- and enantio-selective esterification of only one enantiomer among the isomers. Due to such dynamic nature, all isomers of the substrate alcohols are equally applicable to this DKR method giving the same optically active products. Thus, the developed method can shorten the overall transformation process and also enhance the flexibility of the synthesis routes.