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# Highly Efficient Synthesis of Tetrasubstituted 2, 3-Dihydropyrans by Three-component ‘One-pot’ Reaction

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## Abstract

With ammonium acetate as catalyst, three-component ‘one-pot’ reaction of  $\beta$ -keto perfluoroalkanesulfones, aldehydes and vinyl ethers proceeded smoothly and afforded tetrasubstituted 2, 3-dihydropyrans in moderate to excellent yields. Both aromatic and aliphatic aldehydes, as well as cyclic vinyl ether are compatible with this methodology. All dihydropyran products were obtained as *cis*- and *trans*-diastereomeric mixtures. The relative configurations were established by comparing the coupling constants of anomeric protons of both isomers and confirmed by single-crystal X-ray diffraction analysis.

**Keywords:** Dihydropyran, Perfluoroalkanesulfone,  $\alpha$ ,  $\beta$ -Unsaturated ketone, Hetero Diels-Alder reaction, Three-component

Owing to its strong electron-withdrawing property and multiple reactivity, sulfonyl groups display manifold roles in reactions and thus serve as a powerful synthetic tool for constructing various compounds in organic chemistry.<sup>1-3</sup> Among all sorts of sulfonyl groups, perfluoroalkanesulfonyl  $R_fSO_2$  shows somewhat extraordinary characters due to the strongly electron-withdrawing inductive effect of the perfluoroalkyl group.<sup>4-6</sup>

In our continuing efforts on studying perfluoroalkanesulfone compounds, we have

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