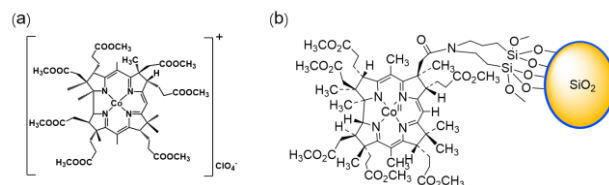


## Alkanes Oxidation with *m*-CPBA Catalyzed by B<sub>12</sub> Complex

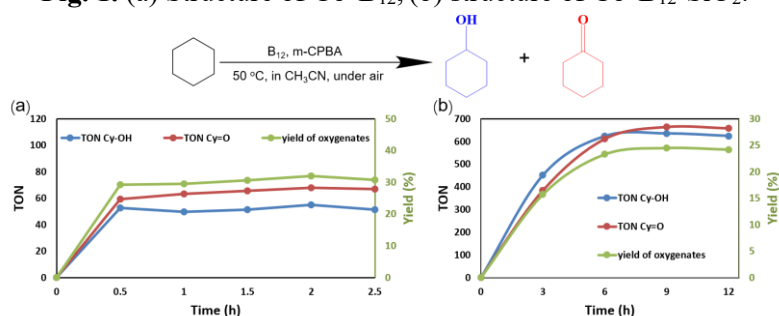
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**Keywords:** Alkane Oxidation; Catalysis; B<sub>12</sub> Complex; *m*-CPBA; Silica-gel

Alkane oxidation to value-added alcohol and ketone is important for industrial application. Thus, the possibility of converting alkane into alcohols, ketones etc., is a challenging goal in contemporary catalytic chemistry.<sup>1</sup> In previous reports, due to stable nature of C-H bond, higher activation energy is required to carry out this reaction at high temperature. Due to very less solubility of oxygen, high pressure is also desired.<sup>2</sup> In fact, modern industrial methods usually require high pressure and temperature when using soluble cobalt as catalyst. In this work, we first synthesized B<sub>12</sub> complex as homogeneous catalyst (Fig. 1a) and then immobilized it on silica particles to form heterogenous catalyst (Fig. 1b). The alkanes oxidation reaction was performed in mild conditions under air, using *m*-CPBA as oxidant, catalyzed by homogeneous and heterogenous catalyst. For the model substrate of cyclohexane, total turnover numbers and yields of over 147 and 36% were provided respectively in homogenous (Fig. 2a), over 1200 and 24% were provided respectively in heterogenous (Fig. 2b). It exhibits a good catalytic performance and is the first reported reference for extensive application of vitamin B<sub>12</sub> in catalytic oxidation reaction. And more kinds of alkane substrates will be checked in the future work.<sup>3</sup>



**Fig. 1.** (a) Structure of Co<sup>II</sup>B<sub>12</sub>, (b) structure of Co<sup>II</sup>B<sub>12</sub>-SiO<sub>2</sub>.



**Fig. 2.** Time profiles of TON and yield in the (a) Co<sup>II</sup>B<sub>12</sub>, (b) Co<sup>II</sup>B<sub>12</sub>-SiO<sub>2</sub> catalyst system.

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