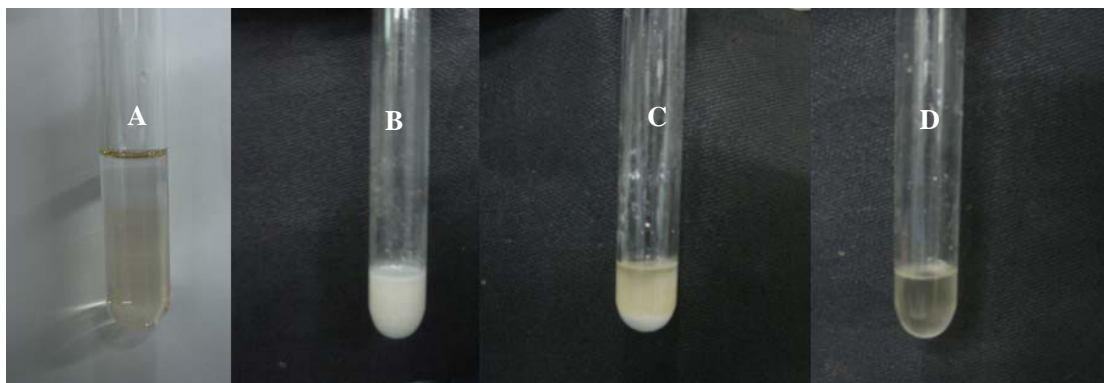


## Supplementary information



**S. Figure 1** The reaction mixtures obtained at different conditions:

**A:** 1 mL [Bpy]BF<sub>4</sub> mixed with 0.5 mL *cis*-cyclooctene.

**B:** 1.5 mL [Bpy]BF<sub>4</sub> mixed with 1.5 mL [Dopy]BF<sub>4</sub>, 0.5 mL *cis*-cyclooctene, 0.75 mL 30 wt% aqueous H<sub>2</sub>O<sub>2</sub>, and 0.1 mmol catalyst **1** after stirring at room temperature for 30 min.

**C:** 1.5 mL [Bpy]BF<sub>4</sub> mixed with 1.5 mL [Dopy]BF<sub>4</sub>, 0.5 mL *cis*-cyclooctene, 0.75 mL 30 wt% aqueous H<sub>2</sub>O<sub>2</sub>, and 0.1 mmol catalyst **1** after stirring at room temperature for 30 min and then standby.

**D:** the mixture of 1.5 mL [Bpy]BF<sub>4</sub>, 1.5 mL [Dopy]BF<sub>4</sub>, 0.5 mL *cis*-cyclooctene, 0.75 mL 30 wt% aqueous H<sub>2</sub>O<sub>2</sub>, and 0.1 mmol catalyst **1** after the reaction at 80 °C for 1 h and then cooling to room temperature.