Supplementary Information

Recyclable Indium Catalysts for Additions of 1,3-Dicarbonyl Compounds to Unactivated Alkynes Affected by Structure and Acid Strength of Solid Supports

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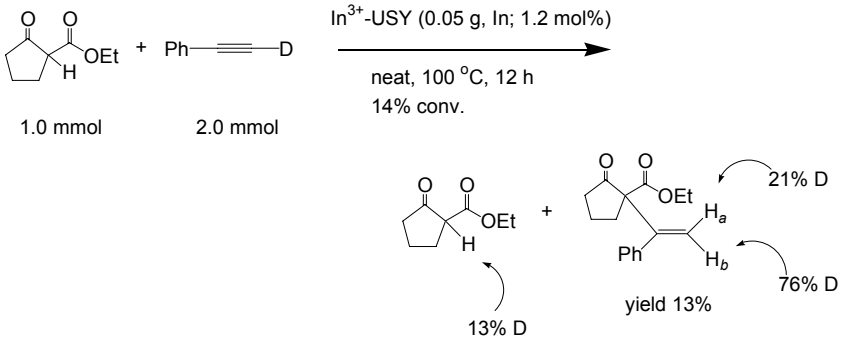
Reaction with Deuterated Phenylacetylene: Into a pyrex pressure tube (15 mL) were placed the In^{3+}-USY (5.0×10^{-2} g, In: 1.2×10^{-2} mmol), ethyl cyclopentanone-2-carboxylate (1.0 mmol), and 1-deuterio-2-phenylethyne (2.0 mmol). The resulting mixture was vigorously stirred at 100 ^{o}C under Ar. After 12 h, the catalyst was separated by filtration and ^{1}H NMR analysis revealed 14% yield of the addition product. The ratios of deuterium at *cis*/*trans*-position of product and deuterium incorporation to the dicarbonyl substrate were also determined by ^{1}H NMR.



XRD

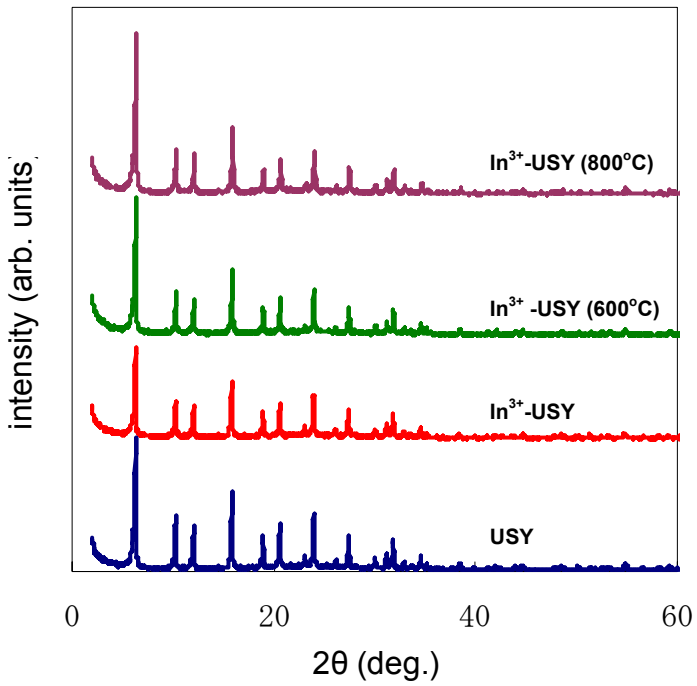


Figure 1S. XRD patterns of In^{3+}-USY samples and USY.

XAFS

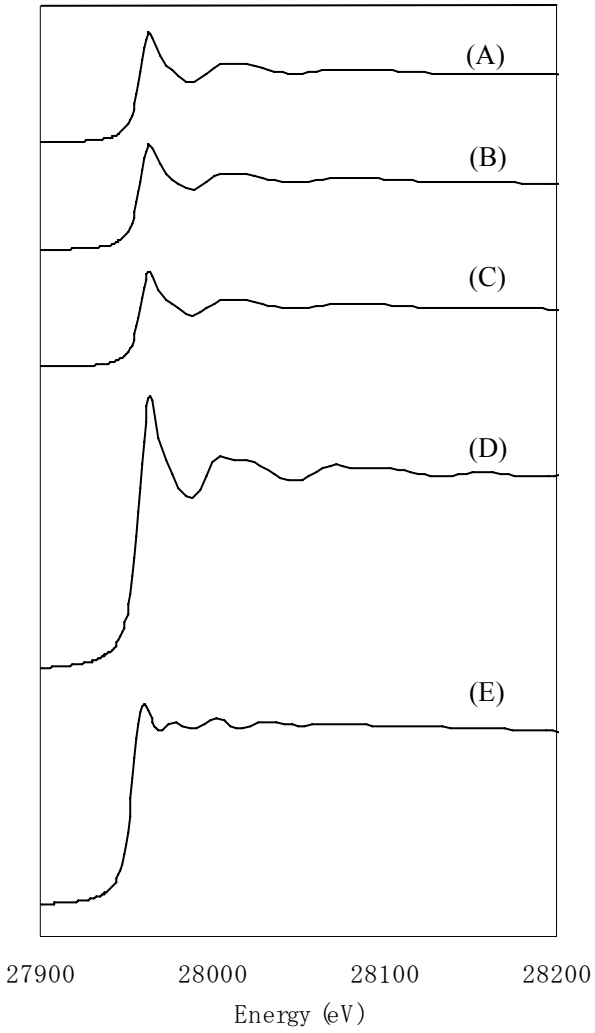


Figure 2S. In K-edge XANES spectra for (A) used In^{3+}-USY calcined at 800 ^{o}C, (B) used In^{3+}-USY, (C) fresh In^{3+}-USY, (D) In_2O_3, and (E) In foil.

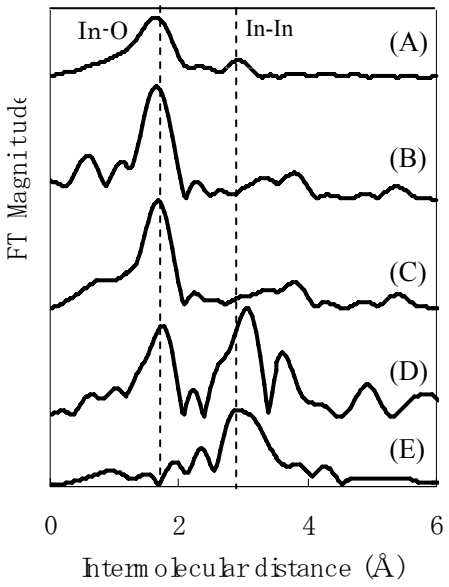


Figure 3S. In K-edge FT-EXAFS spectra for (A) used In^{3+}-USY calcined at 800 ^{o}C, (B) used In^{3+}-USY, (C) fresh In^{3+}-USY, (D) In_2O_3, and (E) In foil.

FT-IR

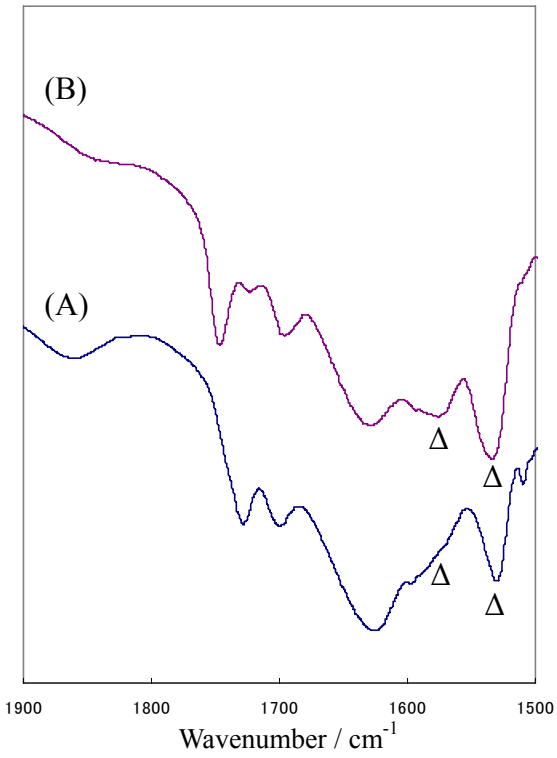


Figure 4S. FT-IR spectra for (A) In^{3+}-USY treated with acetyl acetone and (B) In^{3+}-mont treated with acetyl acetone. Δ: enolate species.

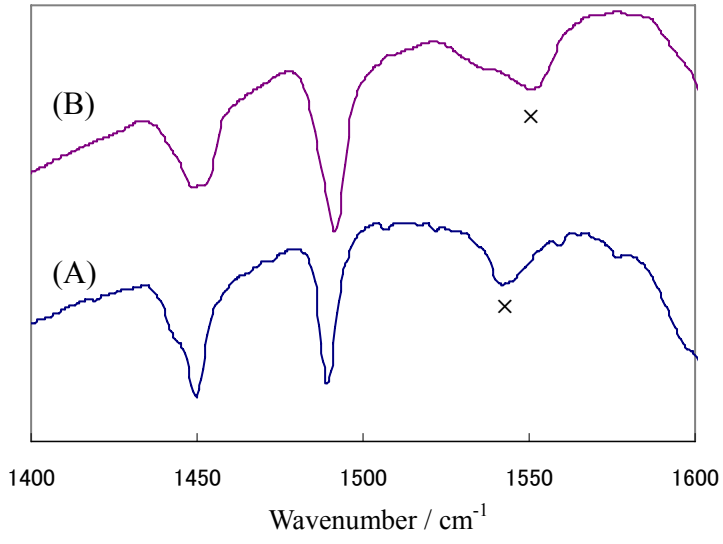


Figure 5S. FT-IR spectra for (A) In^{3+}-USY treated with pyridine and (B) In^{3+}-mont treated with pyridine. ×: Lewis acid site. After the adsorption of pyridine, the excess and weakly adsorbed pyridine was removed by evacuating the samples at 150 ^{o}C for 12 h. The IR spectra of the strongly adsorbed pyridine were obtained with self-supporting wafers.