

Figure S-1 XRD pattern of the iron component peeled off from the inner wall of the reactor after dimerization with H₂S.

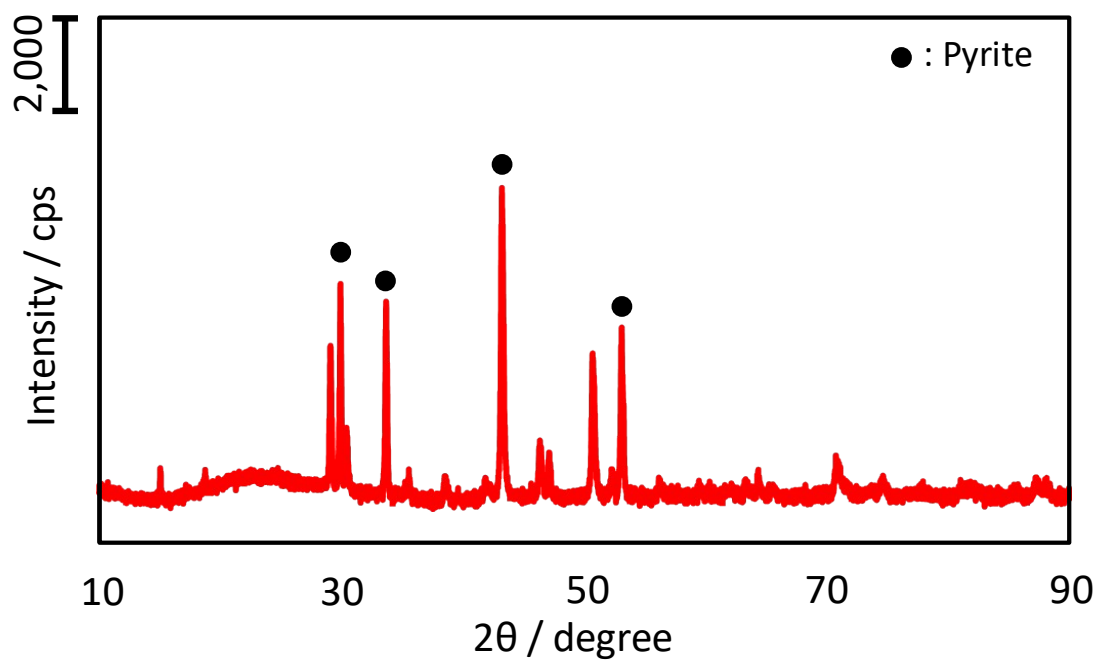


Figure S-2 (a) Carbon balance and isobutene conversion (b) yield of products in isobutene dimerization at 450 °C and 375 °C (*iso*-C₄/H₂S=2/1, 2.5atm).

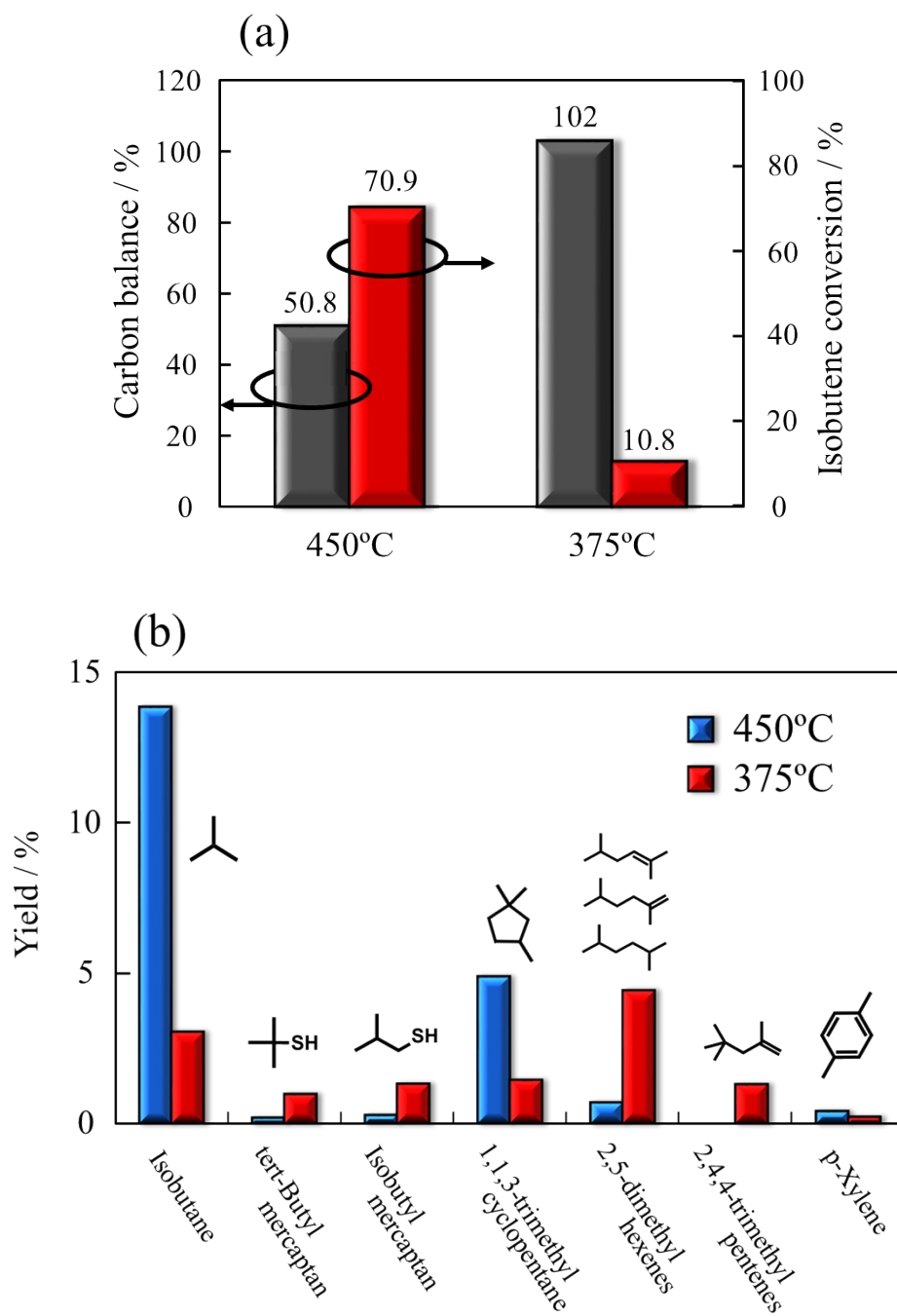


Figure S-3 GC-MS spectrum of tetralin-diluted liquid product in isobutene dimerization at 450 °C (*iso*-C₄/H₂S=2/1, 2.5atm).

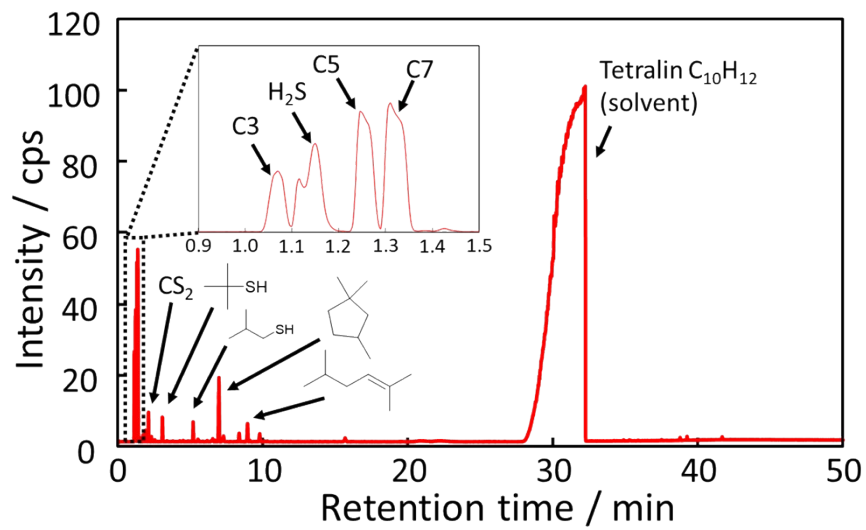


Figure S-4 (a) Carbon balance and isobutene conversion (b) yield of products in isobutene dimerization at 350°C and 375 °C ($iso-C_4/H_2S=2/1, 2.5atm$).

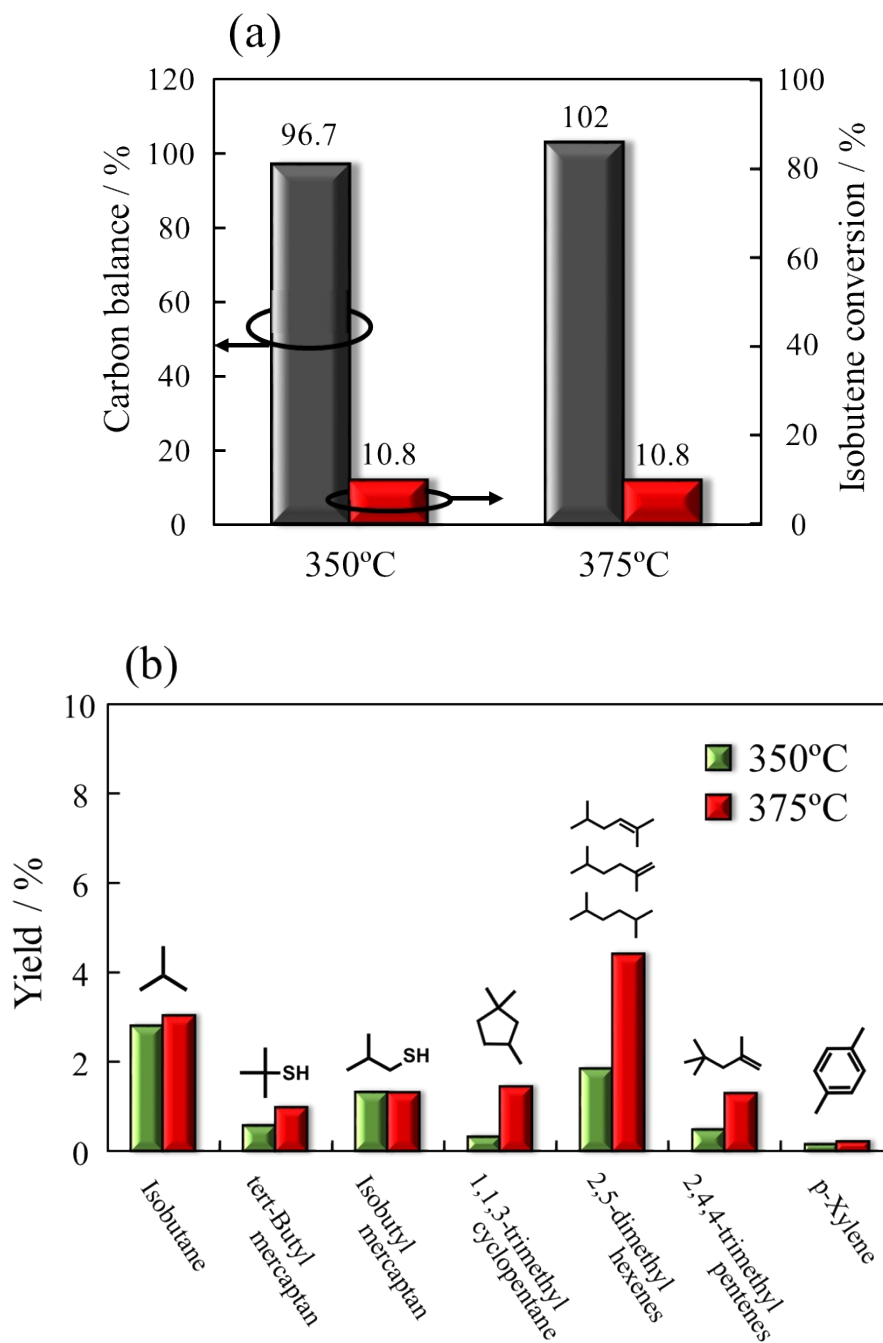


Figure S-5 (a) Carbon balance and isobutene conversion (b) yield of products in isobutene dimerization with $iso-C_4/H_2S=1/5$ and $iso-C_4/H_2S=2/1$ (375 °C, 2.5atm).

