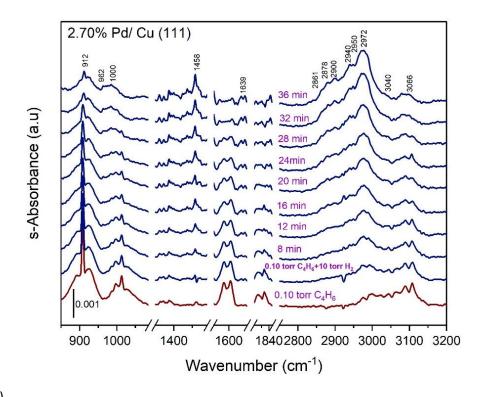
a)



b)

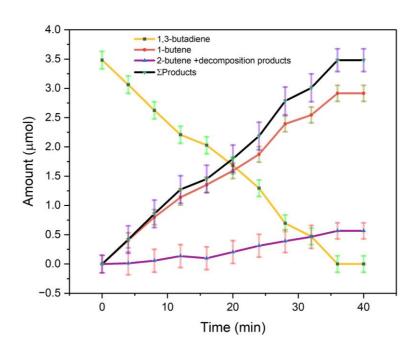


Figure: (a) Gas phase RAIR spectra of 0.10 Torr of 1,3-butadiene and 10.00 Torr of  $H_2$  on 2.7% Pd/Cu (111) at 380 K over time. (b) Relative quantities of reactants and products during the reaction.