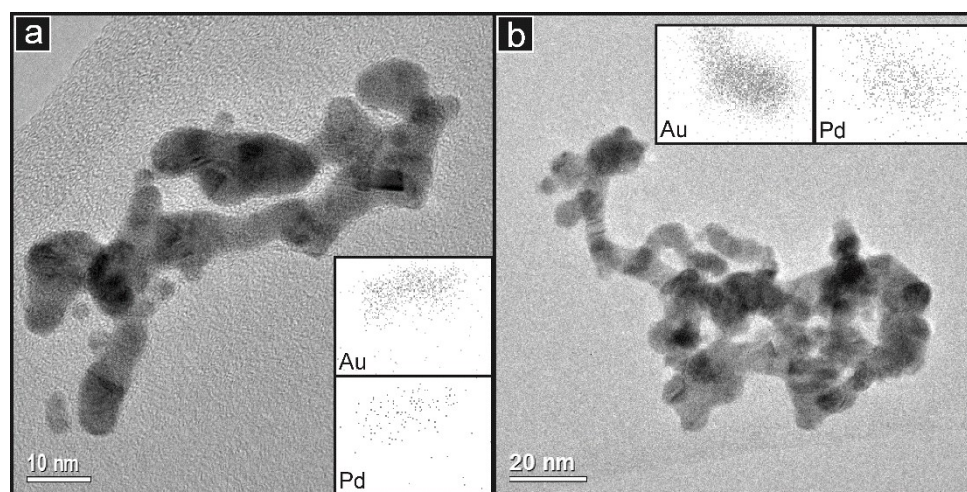
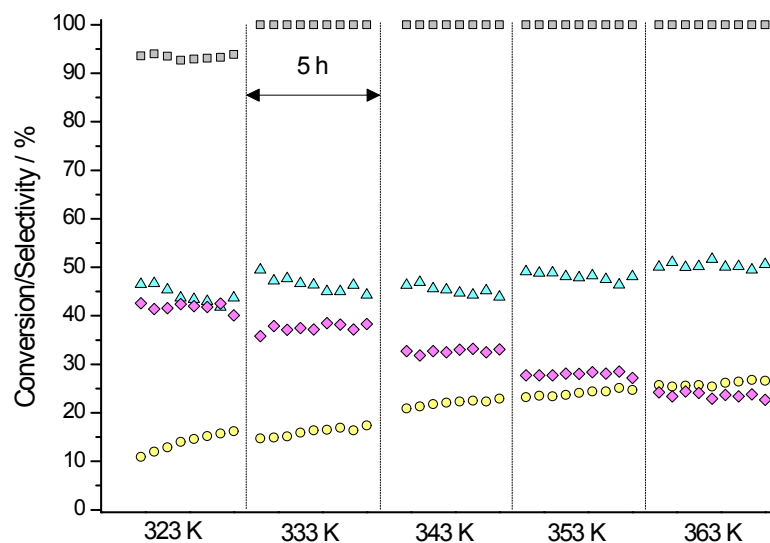


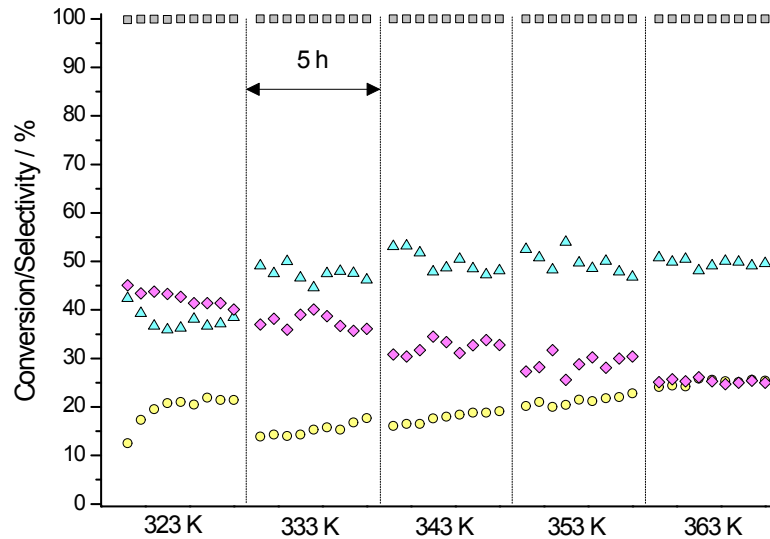
### Supporting information



Supporting information figure S1 - TEM images of groups of unsupported 1.5Pd(Au) nanoparticles (after centrifugation) along with the corresponding EDS elemental maps for Au and Pd.



Supporting information figure S2 - Time on stream data (5 h periods) for 1.5Pd(Au) for at temperature between 323-363 K using a  $\text{H}_2$ : acetylene ratio of 1.8:1. Acetylene conversion (grey squares), ethylene selectivity (yellow circles), ethane (cyan triangles) and oligomer selectivity (pink diamonds).



Supporting information figure S3 - Time on stream data (5 h periods) for 3.3Pd(Au) for at temperature between 323-363 K using a  $\text{H}_2$ : acetylene ratio of 1.8:1. Acetylene conversion (grey squares), ethylene selectivity (yellow circles), ethane (cyan triangles) and oligomer selectivity (pink diamonds).