Ag-promoted mesoporous Ta-SiO_2 catalysts prepared by aerosol-assisted sol-gel for the conversion of ethanol to butadiene

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Supplementary material

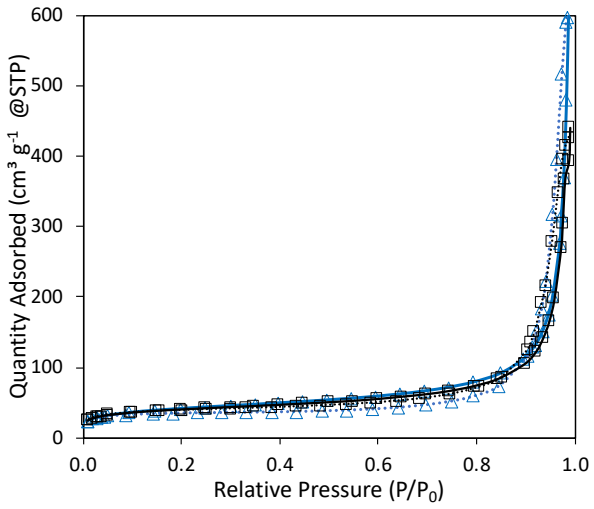

Figure S1: N_2-physisorption isotherms of SiO_2-A (black), 1Ag5Ta/SiO2-A (blue). Adsorption isotherms are plotted as solid lines, desorption isotherms are plotted as dotted lines.

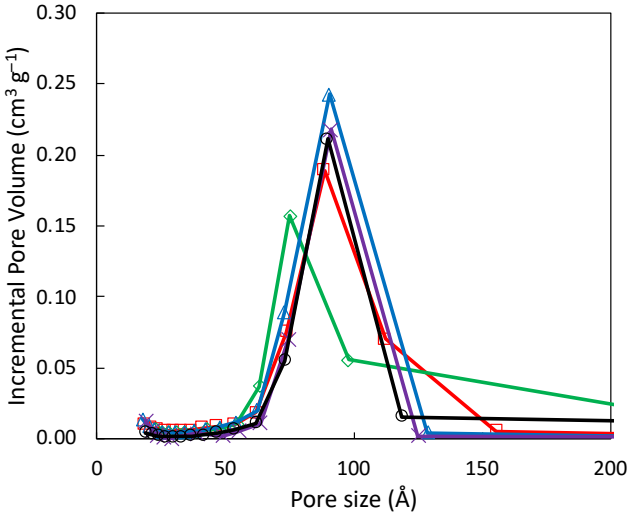

Figure S2: BJH Adsorption Curve of SiO_2 (red ■), 5Ta-SiO_2 (green ◊), 1Ag1Ta-SiO_2 (blue Δ), 1Ag2Ta-SiO_2 (purple ×), 5Ag2Ta-SiO_2 (black ○).

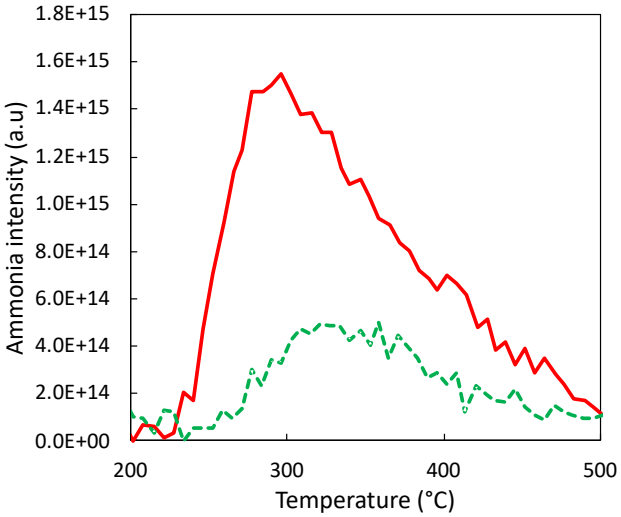

Figure S3: NH_3-TPD profile of 1Ag/5Ta-SiO_2 (solid red line) and 1Ag5Ta/SiO_2 (dotted green line).

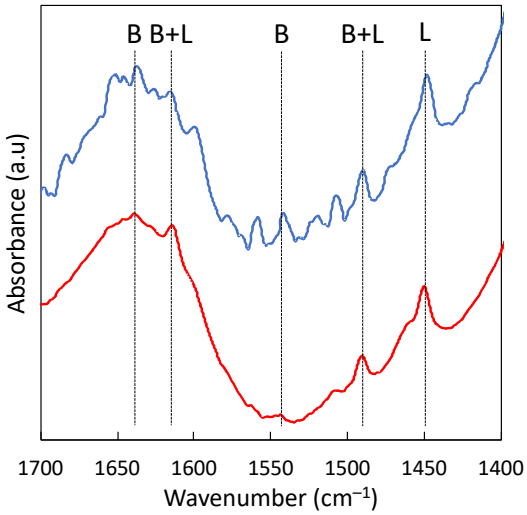

Figure S4: FTIR spectra after pyridine adsorption and evacuation at 150 °C of 2Ta-SiO_2 (bottom red curve) and 2Ta/SiO_2 (top blue curve). B = band corresponding to Bronsted acid sites; L = band corresponding to Lewis acid sites. The latter were estimated to 19.9 µmol g^{-1} compared to 16.3 µmol g^{-1} for 2Ta-SiO_2 and for 2Ta/SiO_2 respectively.

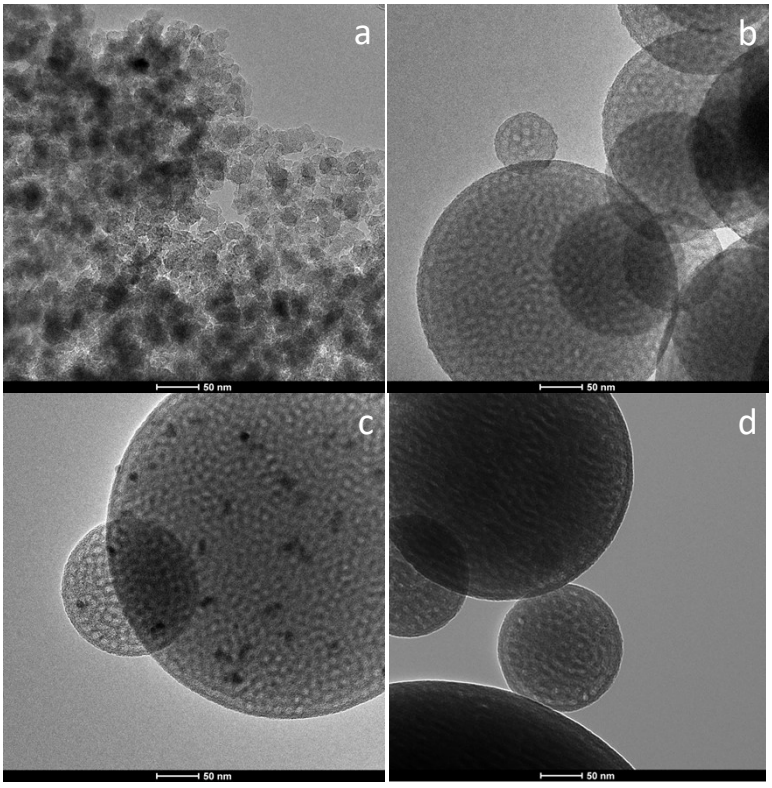

Figure S5: TEM images of 1Ag5Ta/SiO_2-A (a), 1Ag5Ta/SiO_2 (b), 1Ag/5TaSiO_2 (c), 1Ag5Ta-SiO_2 (d).

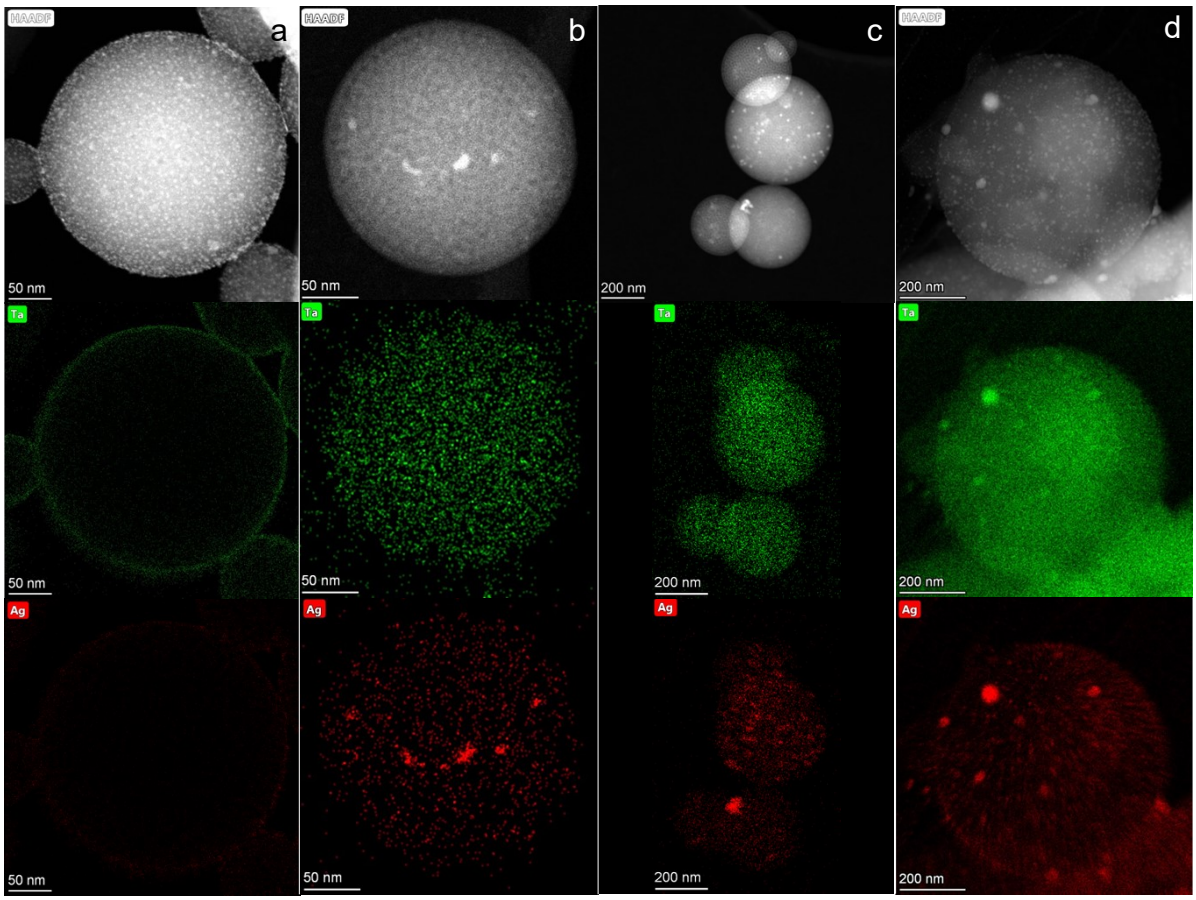

Figure S6: STEM-EDS analysis of 1Ag5Ta/SiO_2 (a), 1Ag/5TaSiO_2 (b), 1Ag5Ta-SiO_2 (c), 5Ag2Ta-SiO_2 (d).

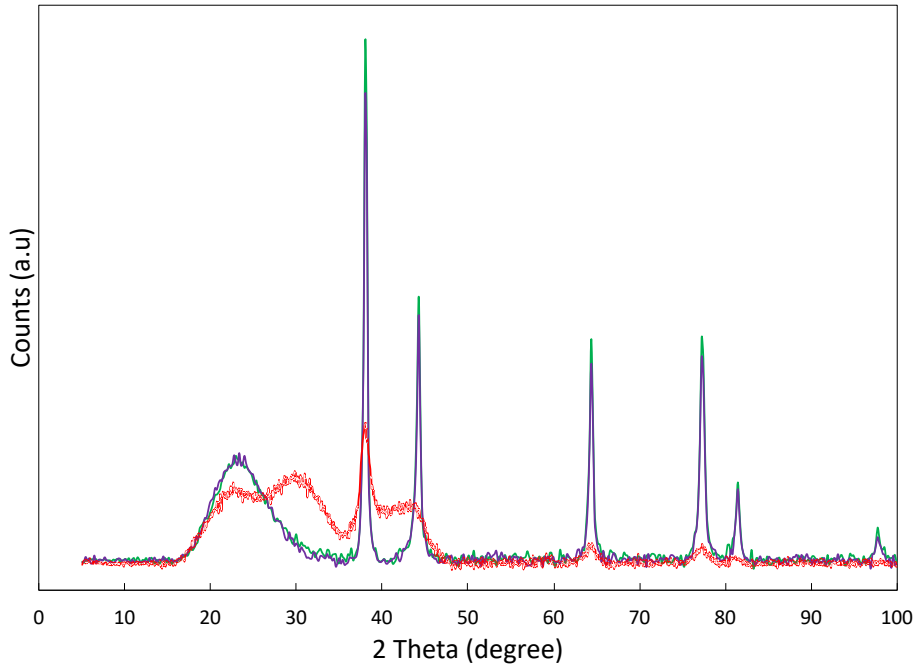

Figure S7: XRD data for 5Ag1Ta-SiO_2 (green); 5Ag2Ta-SiO_2 (purple); uncalcined 5Ag2Ta-SiO_2 (red).

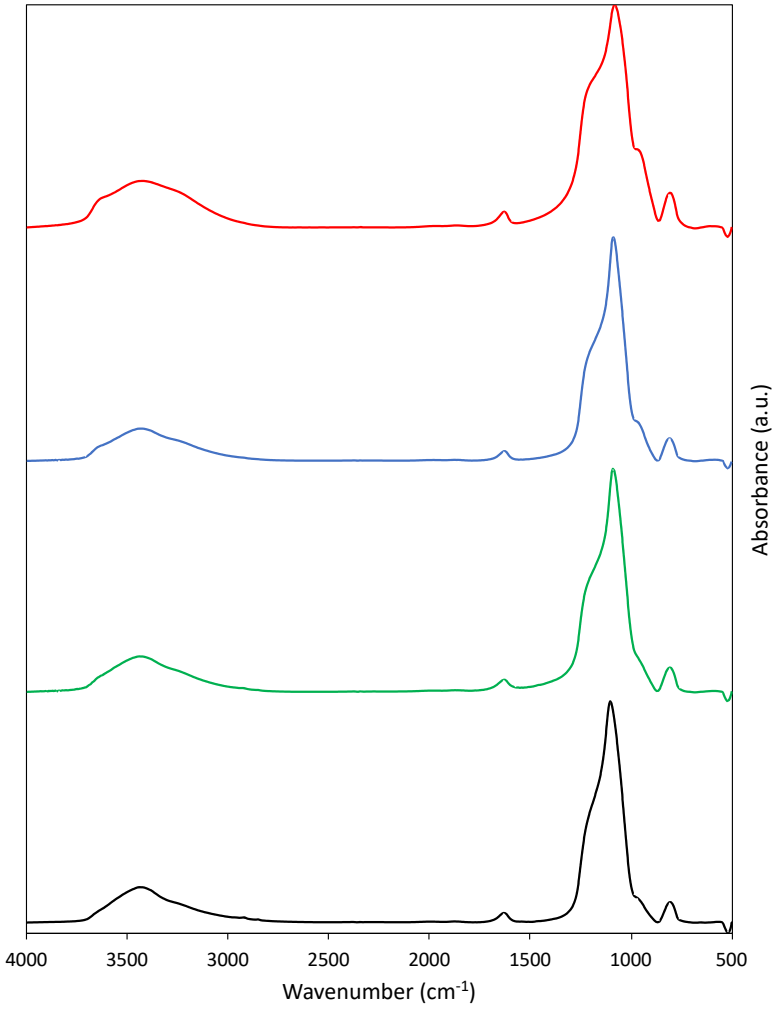

Figure S8: IR spectra of (from bottom to top) 1Ag5Ta/SiO_2-A (black); 1Ag5Ta/SiO_2 (green); 1Ag/5TaSiO_2 (blue); 1Ag5Ta-SiO_2 (red).

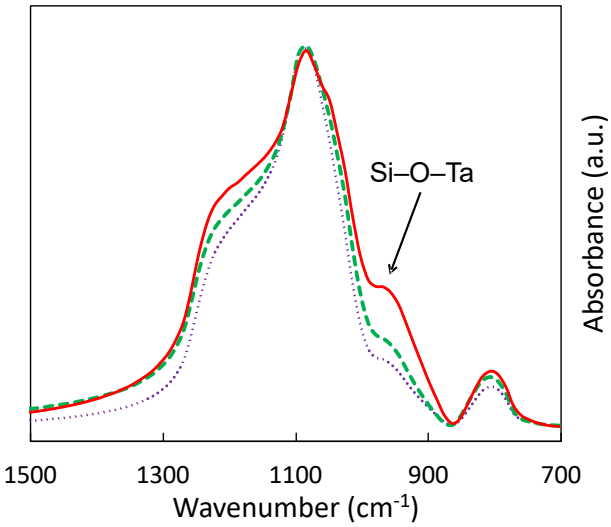

Figure S9: FTIR Spectra obtained on 2Ag/2Ta-SiO_2 (dotted purple line), 2Ag/5Ta-SiO_2 (broken green line), 2Ag/10Ta-SiO_2 (solid red line).

Table S1: Textural properties (N2 physisorption) of various AgTa catalysts

Sample	S_{BET} (m^2 g^{-1})	V_p (mL g^{-1})[a]	D_p (nm) [b]
1Ag1Ta-SiO_2	460	0.55	4.8
1Ag2Ta-SiO_2	430	0.42	4.0
2Ag2Ta-SiO_2	350	0.40	4.6
5Ag2Ta-SiO_2	300	0.38	5.2