catalysts

MDPI

Article

Cobalt nanoparticles supported on TiO_2 for highly selective formation of *N*-benzylideneanilines from nitroarenes and benzaldehyde via reductive imination reaction.

Daniela González-Vera [1], Tatiana M. Bustamante [2], J. Noé Díaz de León [3], Cecilia C. Torres [4,*] and Cristian H. Campos [1,*]

[1] Departamento de Fisicoquímica, Facultad de Ciencias Químicas, Universidad de Concepción, Concepción 4070371, Chile; dagonzalezv@udec.cl
[2] Departamento de Ingeniería Química, Facultad de Ingeniería, Universidad de Concepción, Concepción 4070409, Chile; tatibustamante@udec.cl
[3] Universidad Nacional Autónoma de México, Centro de Nanociencias y Nanotecnología, Ensenada 22860, B.C, Mexico; noejd@ens.cnyn.unam.mx
[4] Departamento de Ciencias Químicas, Facultad de Ciencias Exactas, Universidad Andres Bello, Autopista Concepción-Talcahuano 7100, Talcahuano 4300866, Chile
* Correspondence: cecilia.torres@unab.cl (C.C.T.); ccampos@udec.cl (C.H.C.)

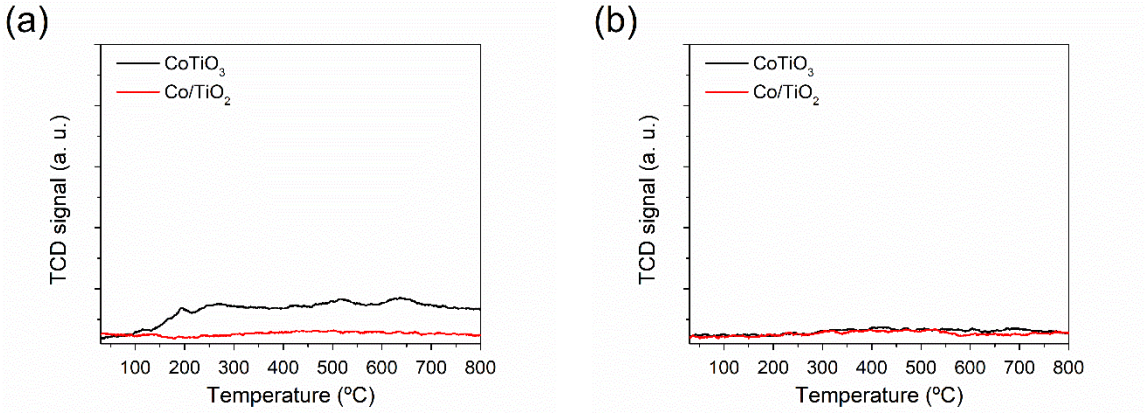

Figure S1. Temperature programed desorption experiments. (a) NH_3 and (b) CO_2

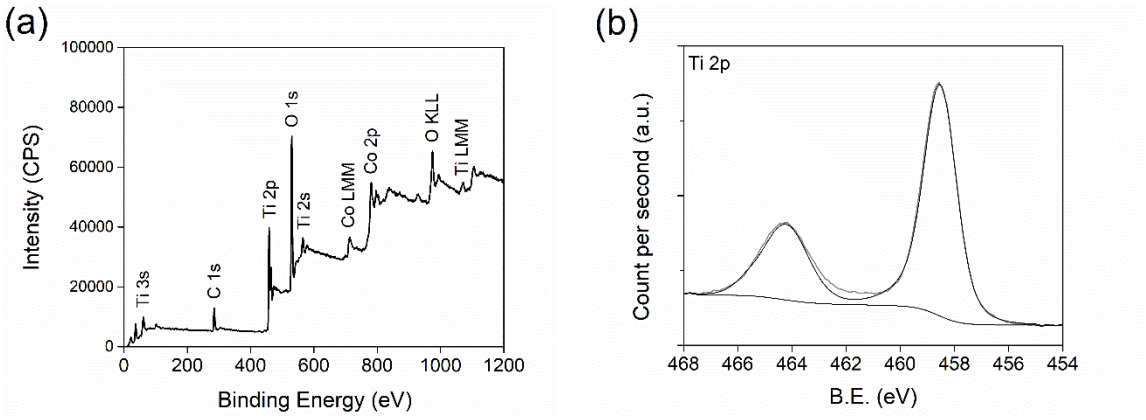

Figure S2. (a) XPS survey spectrum and (b) XPS high-resolution XPS scan spectra over Ti 2p.

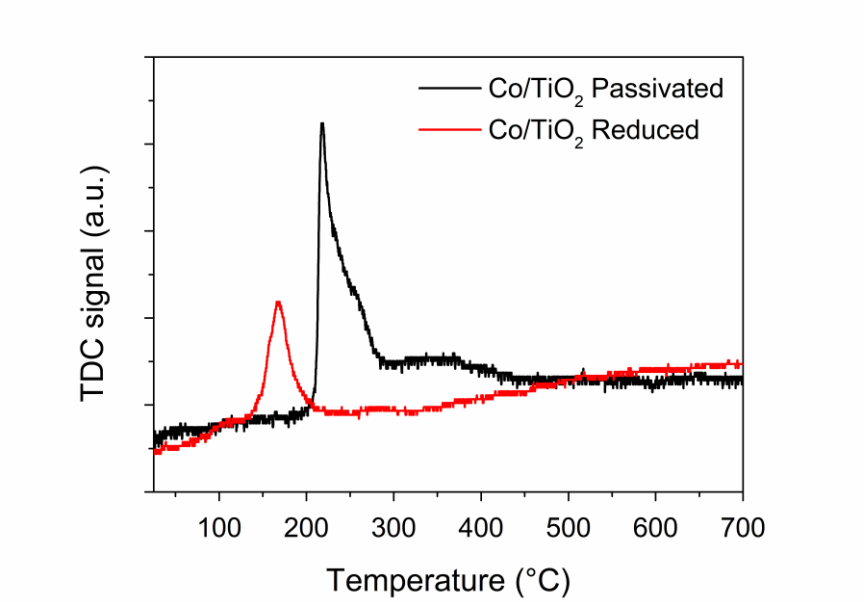

Figure S3. TPR characterization of passivated Co/TiO_2 catalyst.

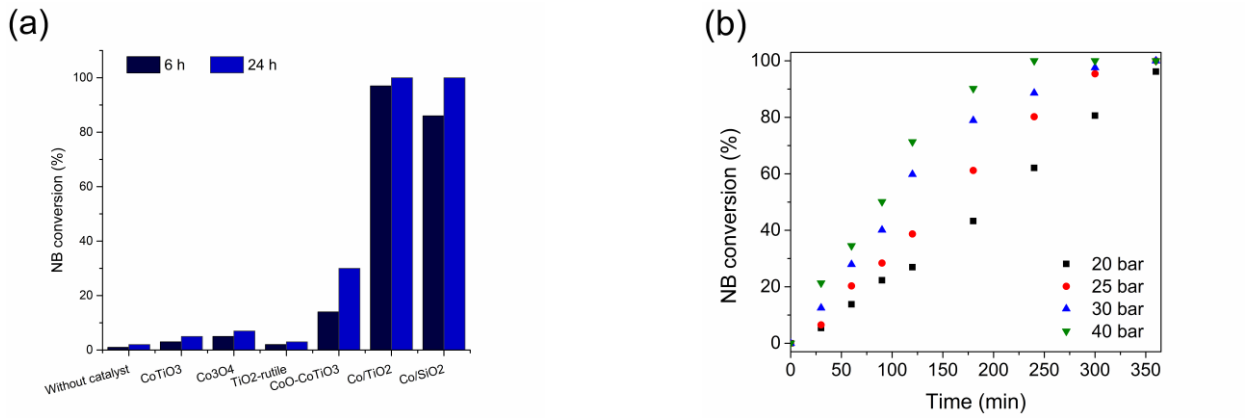

Figure S4. (a) The effect of non-catalyzed and different catalysts in the reductive imination of NB and BZ. Reaction conditions: Nitrobenzene (2 mmol), benzaldehyde (2 mmol), catalyst mass (20 mg), ethyl acetate (50 mL), H_2 (20 bar) at 120°C; and (b) Conversion vs time profiles for the Co/TiO_2 catalysts at different pressures.

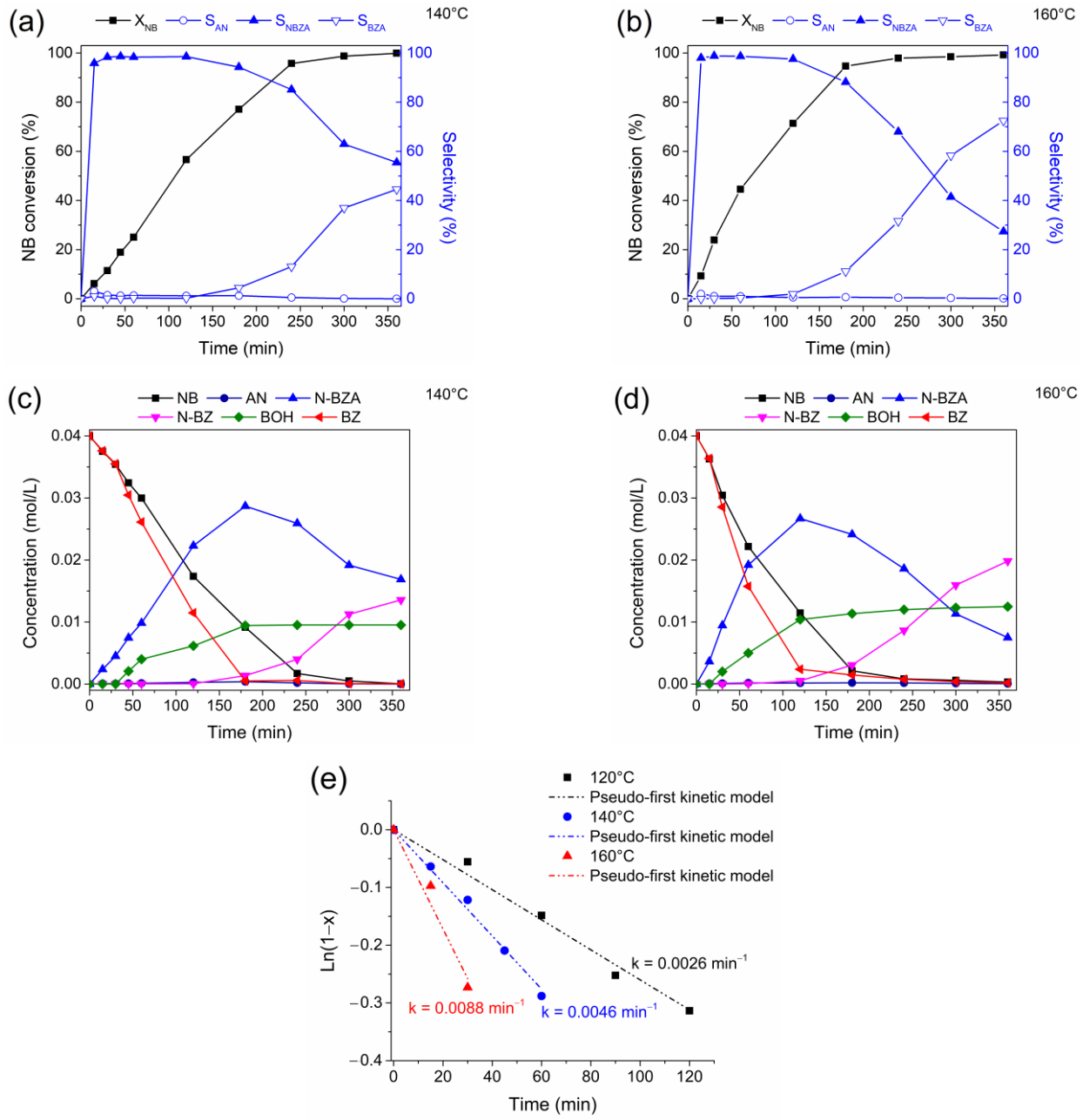

Figure S5. Kinetic profiles for the Co/TiO_2 catalysts at different temperatures. (a – b) NB conversion and *N*-based products selectivity, (c – d) products distribution in function of time and (e) pseudo-first kinetic adjustment for the NB consumption.

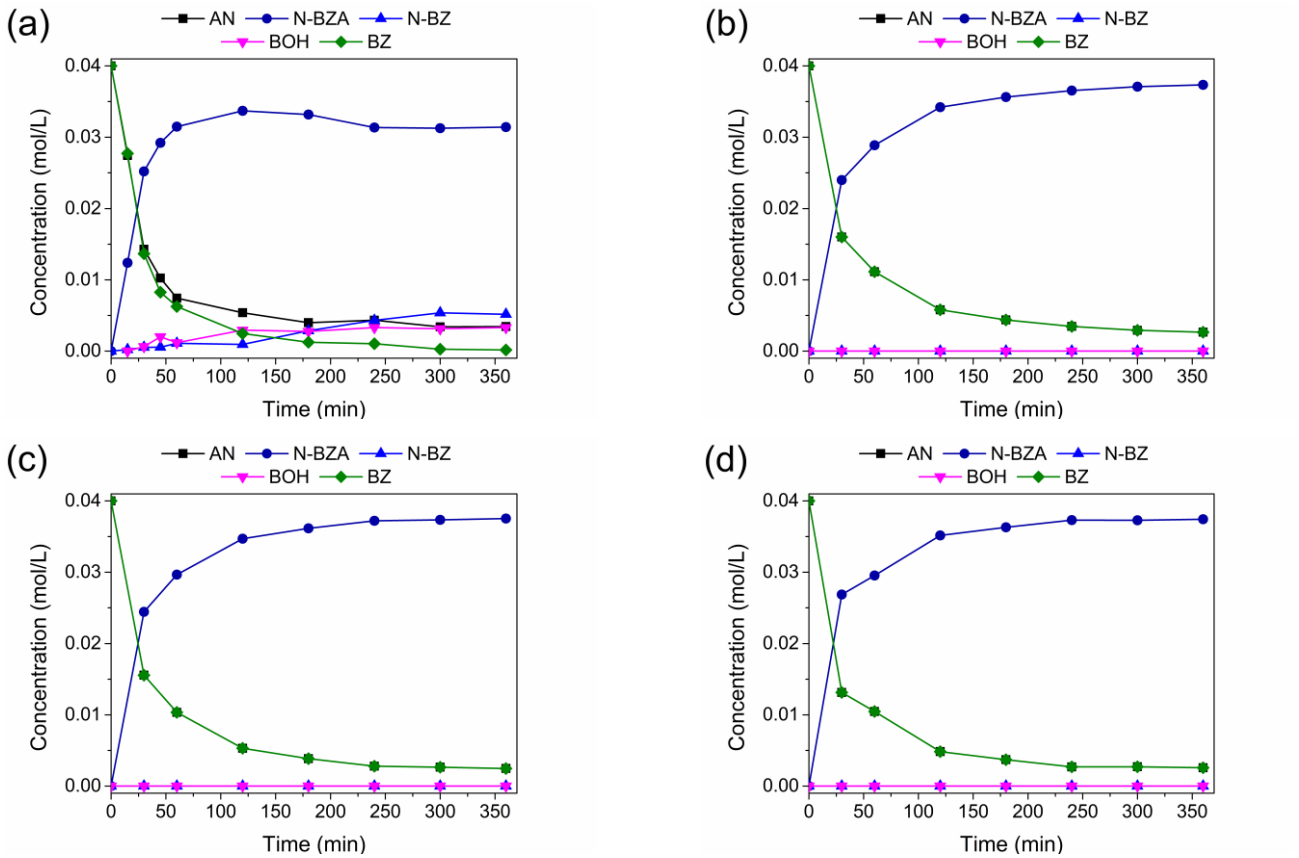

Figure S6. Concentration vs time profile for the control experiments for the imine-formation using AN and BZ. (a) Co/TiO_2 catalyst with H_2 at 20 bar, (b) Co/TiO_2 catalyst with Ar at 5 bar, (c) without catalyst with H_2 at 20 bar and (d) without catalyst with Ar at 5 bar. Reaction conditions: AN (2 mmol), BZ (2 mmol), catalyst (20 mg), ethyl acetate (50 mL), and 120°C.

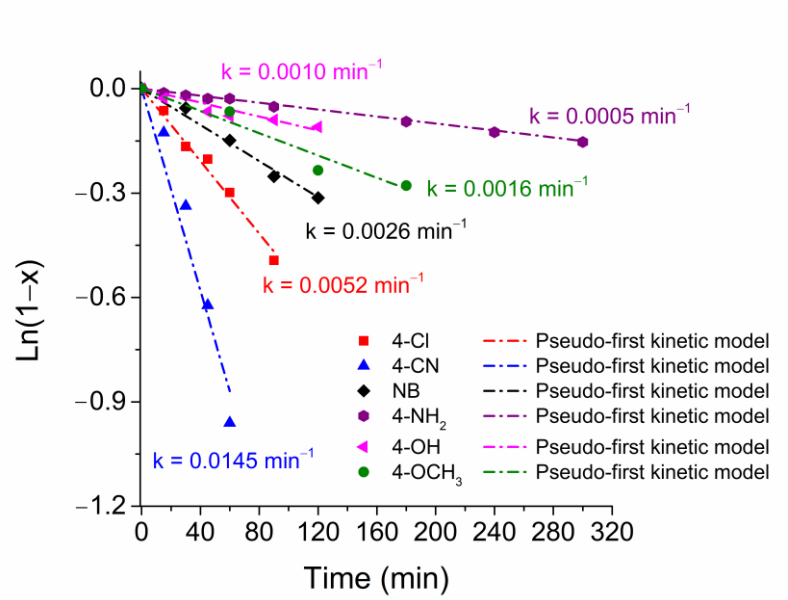

Figure S7. Pseudo-first kinetic adjustment for the conversion profiles of different 4-substituted NB substrates.

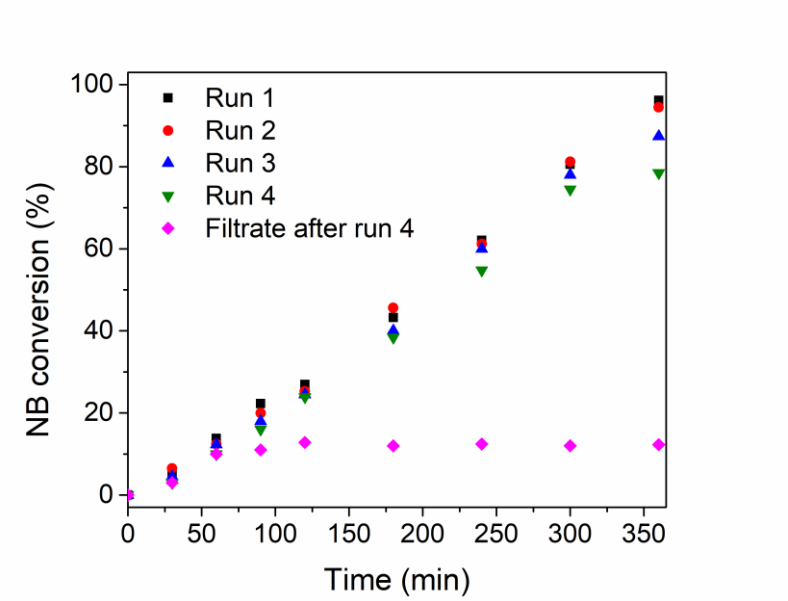

Figure S8. Reusability and hot filtration after the fourth cycle of Co/TiO_2 catalysts for NB reductive imination with BZ.

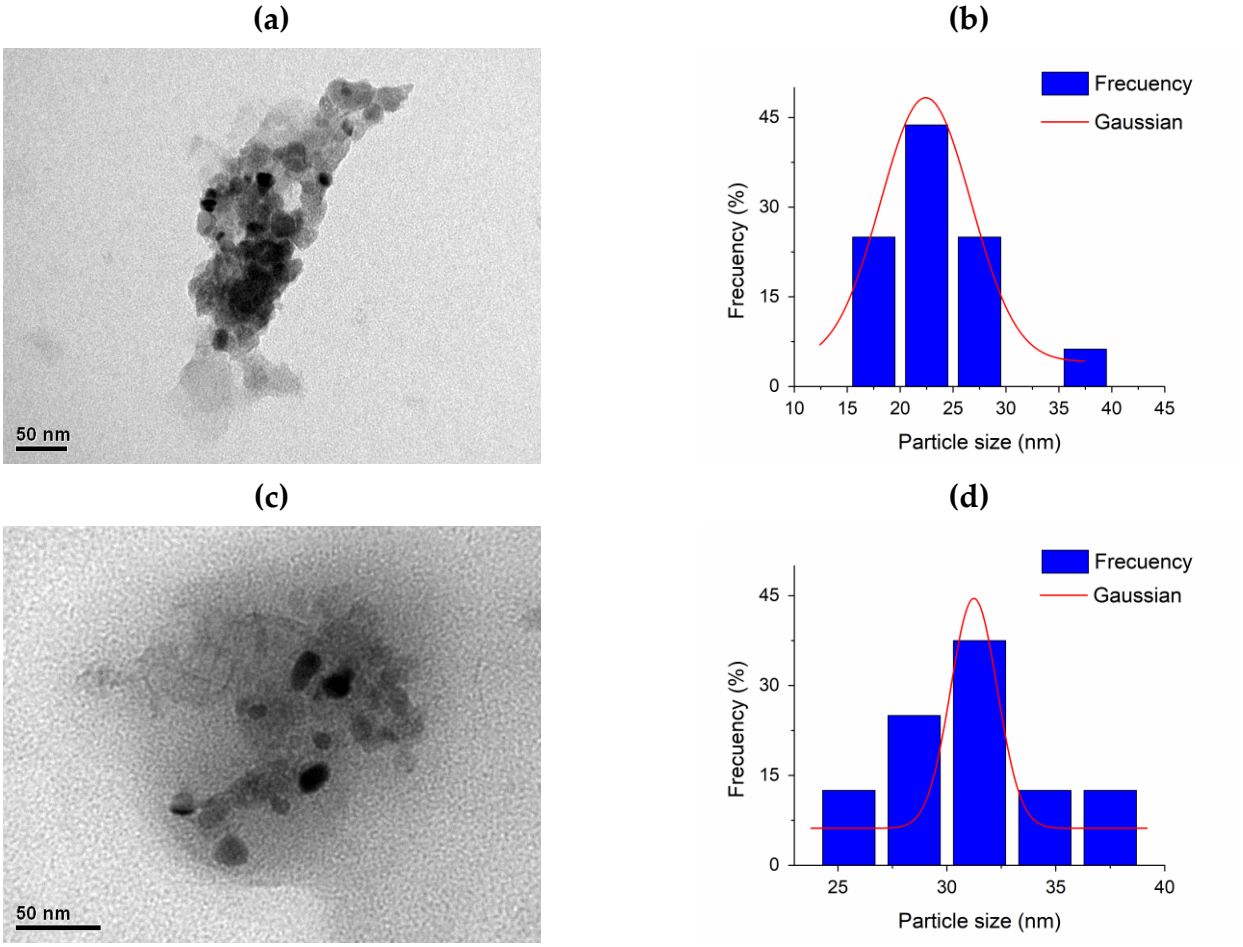

Figure S9. TEM post-reaction for the Co/TiO_2 catalyst. (a) after 4th cycle, (b) Co-NPs size distribution, (b) after catalyst regeneration and (d) Co-NPs size distribution.