

Non-oxidative dehydroaromatization of methane: an effective reaction-regeneration cyclic operation for catalyst life extension

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Figure S1. X-Ray diffraction (XRD) patterns of (A) ZSM-5, (B) IM-5, (C) TNU-9 and (D) MCM-22 before and after the molybdenum loading

Figure S2. SEM pictures of Mo/ZSM-5 (A1, A2), Mo/IM-5 (B1, B2), Mo/TNU-9 (C1, C2) and Mo/MCM-22 (D1, D2), employing a secondary electron (SE) detector (figures on the left), and a backscatter electron (BSE) detector (figures on the right). Si and Al are showed in gray scale while Mo particles correspond to white dots.

Figure S3. Methane conversion (A), summatory of yield to HC products (B), selectivity to aliphatics (C), to aromatics (D), to benzene (E) and to naphthalene (F) versus time-on-stream over Mo/ZSM-5 when the carburation step (previous to the reaction) is started at room temperature (■) or at 723K (■)

Figure S4. Methane conversion (A), total yield to HC products (B) and selectivity to benzene (C) for the optimized reaction/regeneration cyclic procedure employing 10 vol.% of O₂ in the regeneration step and re-carburating the catalyst after the calcination (◆) in comparison with 18h TOS MDA reaction (---■---) over Mo/IM-5

Figure S5. Methane conversion (A), total yield to HC products (B) and selectivity to benzene (C) for the optimized reaction/regeneration cyclic procedure employing 10 vol.% of O₂ in the regeneration step and re-carburating the catalyst after the calcination (◆) in comparison with 18h TOS MDA reaction (—■—) over Mo/TNU-9

Figure S6. Methane conversion (A), total yield to HC products (B) and selectivity to benzene (C) for the optimized reaction/regeneration cyclic procedure employing 10 vol.% of O₂ in the regeneration step and re-carburating the catalyst after the calcination (◆) in comparison with 18h TOS MDA reaction (—■—) over Mo/MCM-22

Figure S1.

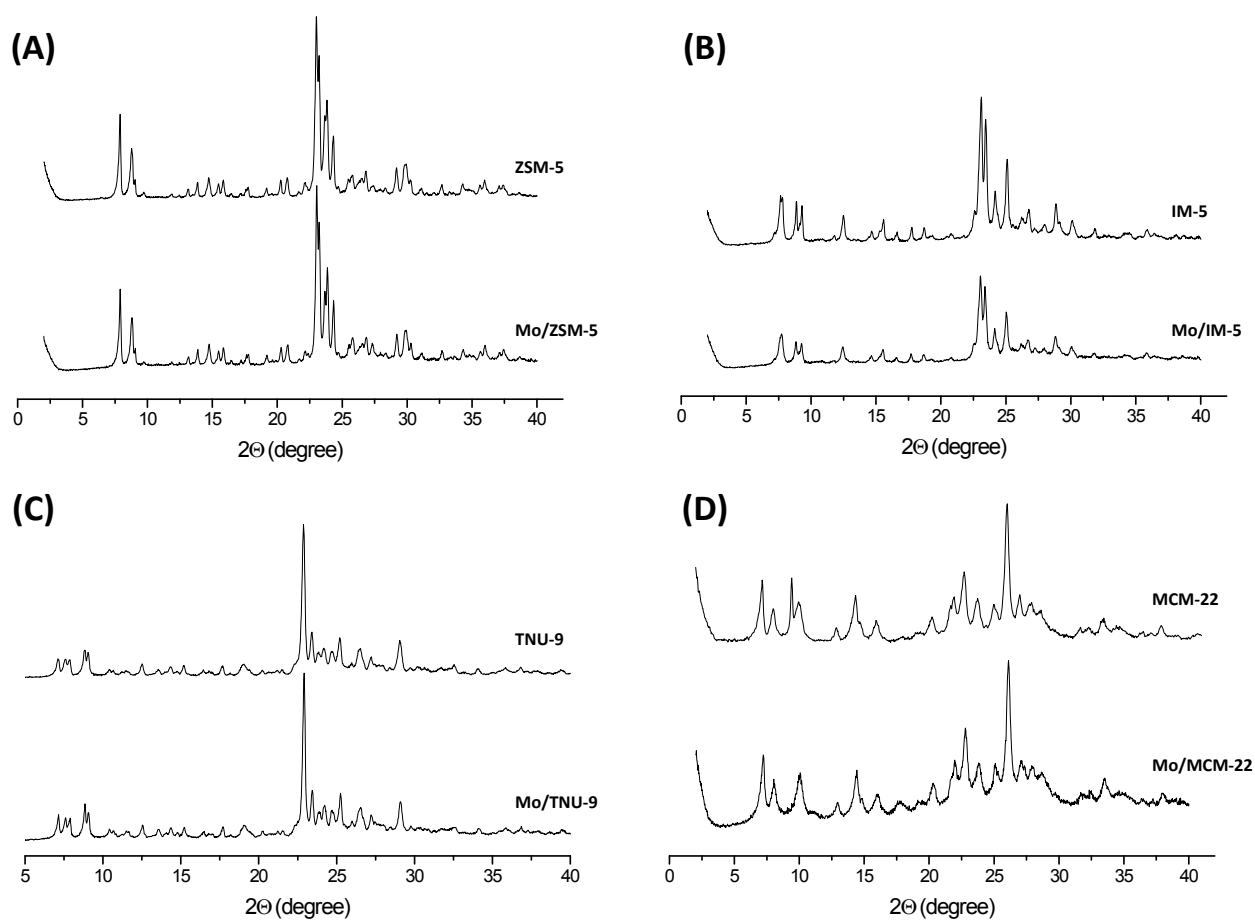


Figure S2.

10 μm

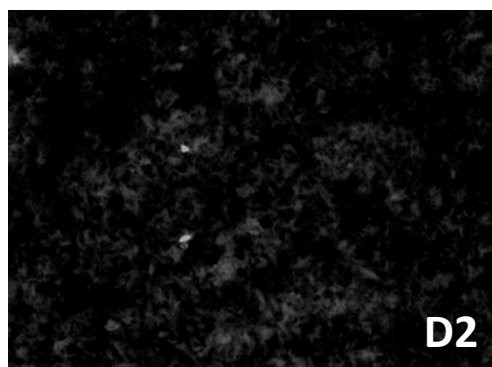
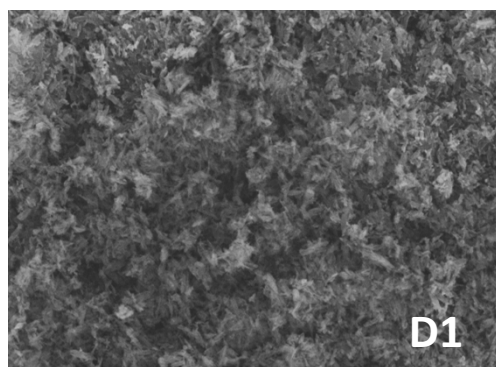
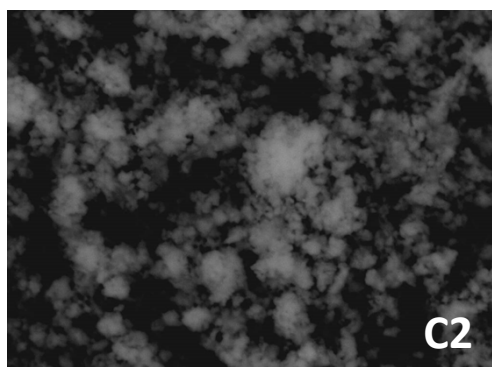
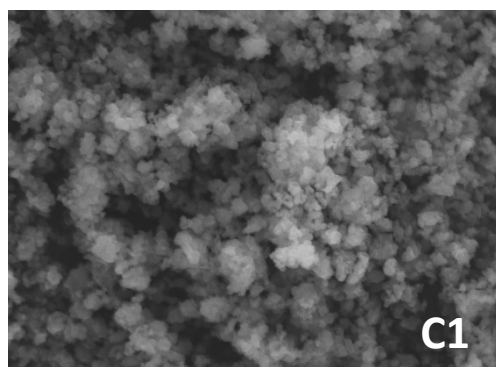
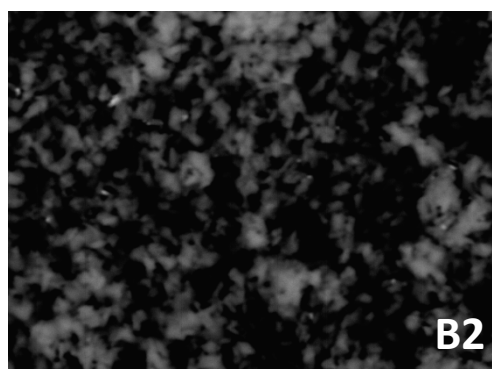
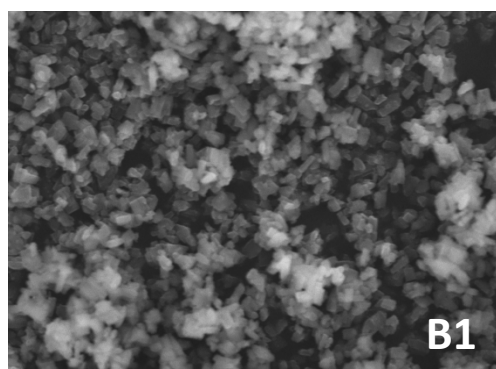
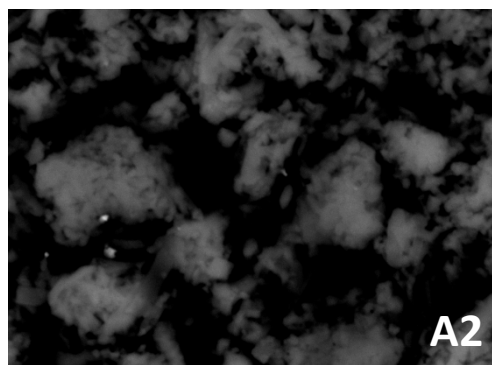
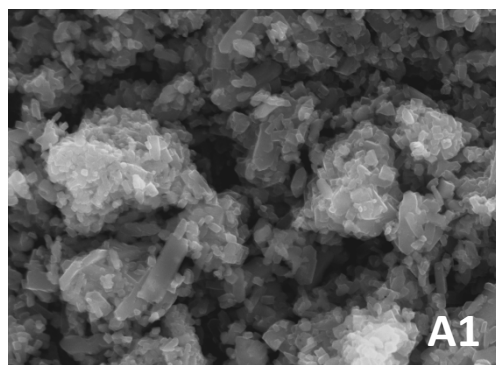


Figure S3.

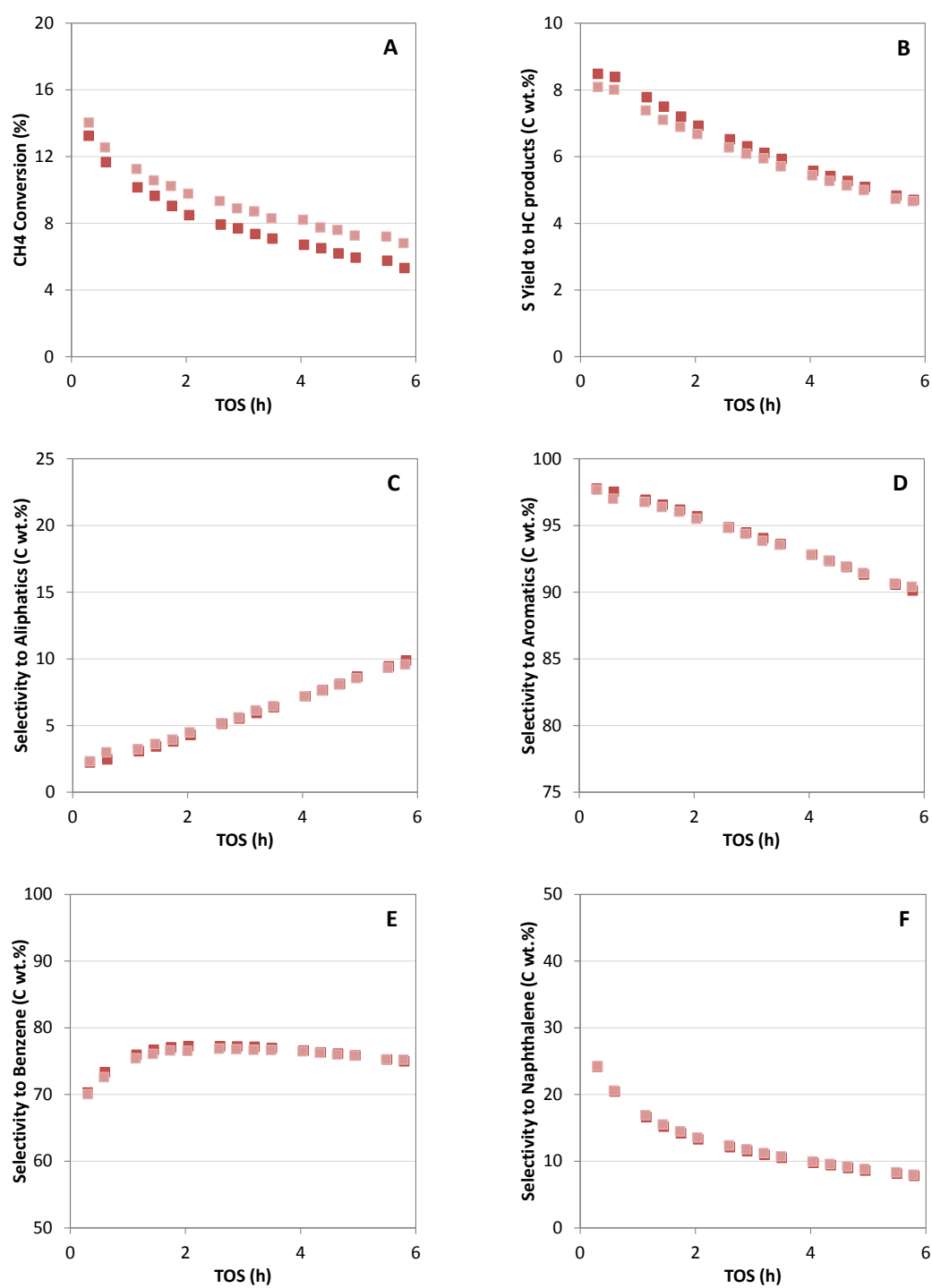


Figure S4.

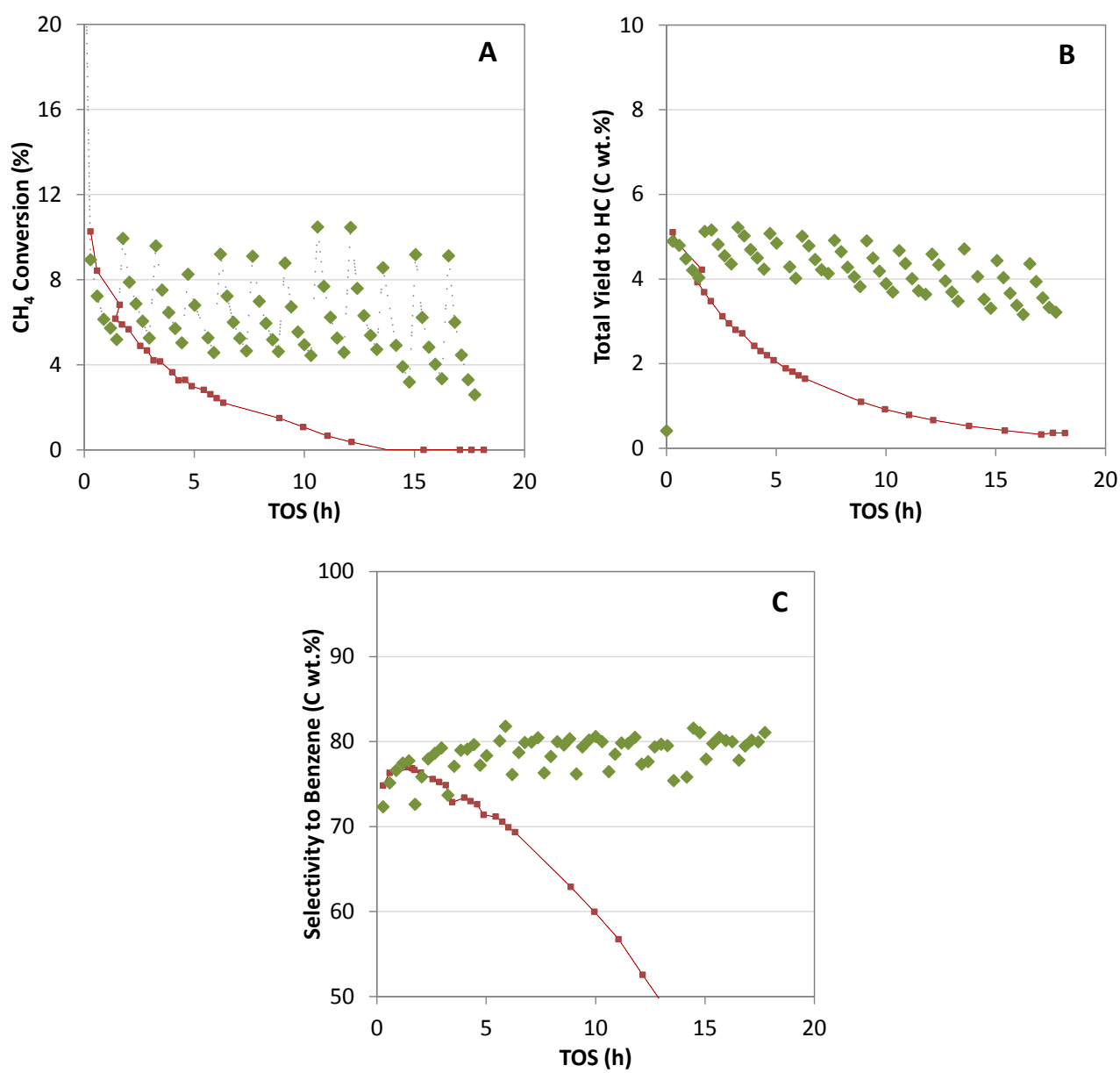


Figure S5.

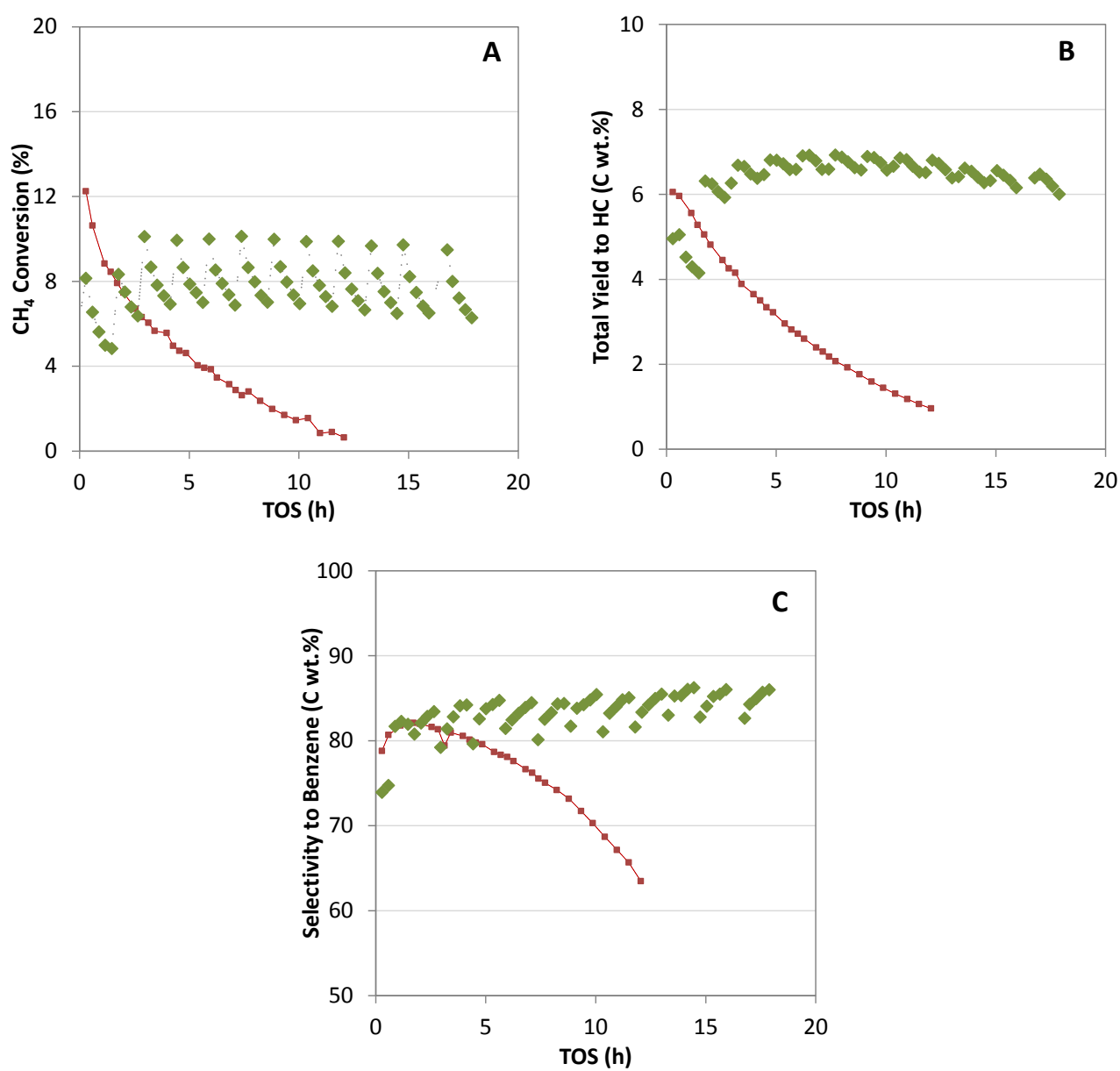


Figure S6.

