

Supplementary Materials for

Selective Synthesis of Levulinic Ester from Furfural Catalyzed by Hierarchical Zeolites

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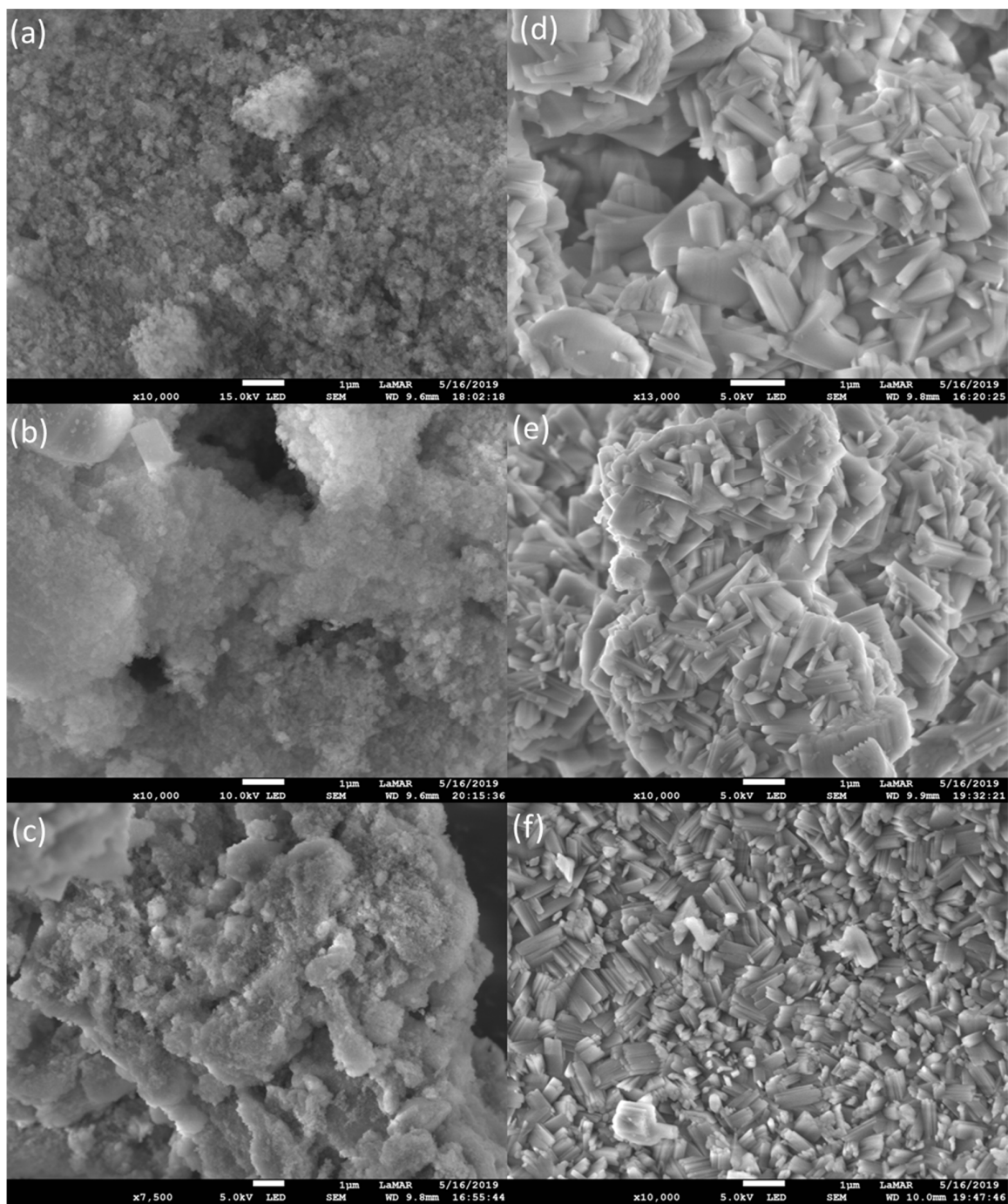


Figure S1. SEM images for the (a,b,c) beta and (d,e,f) mordenite samples.

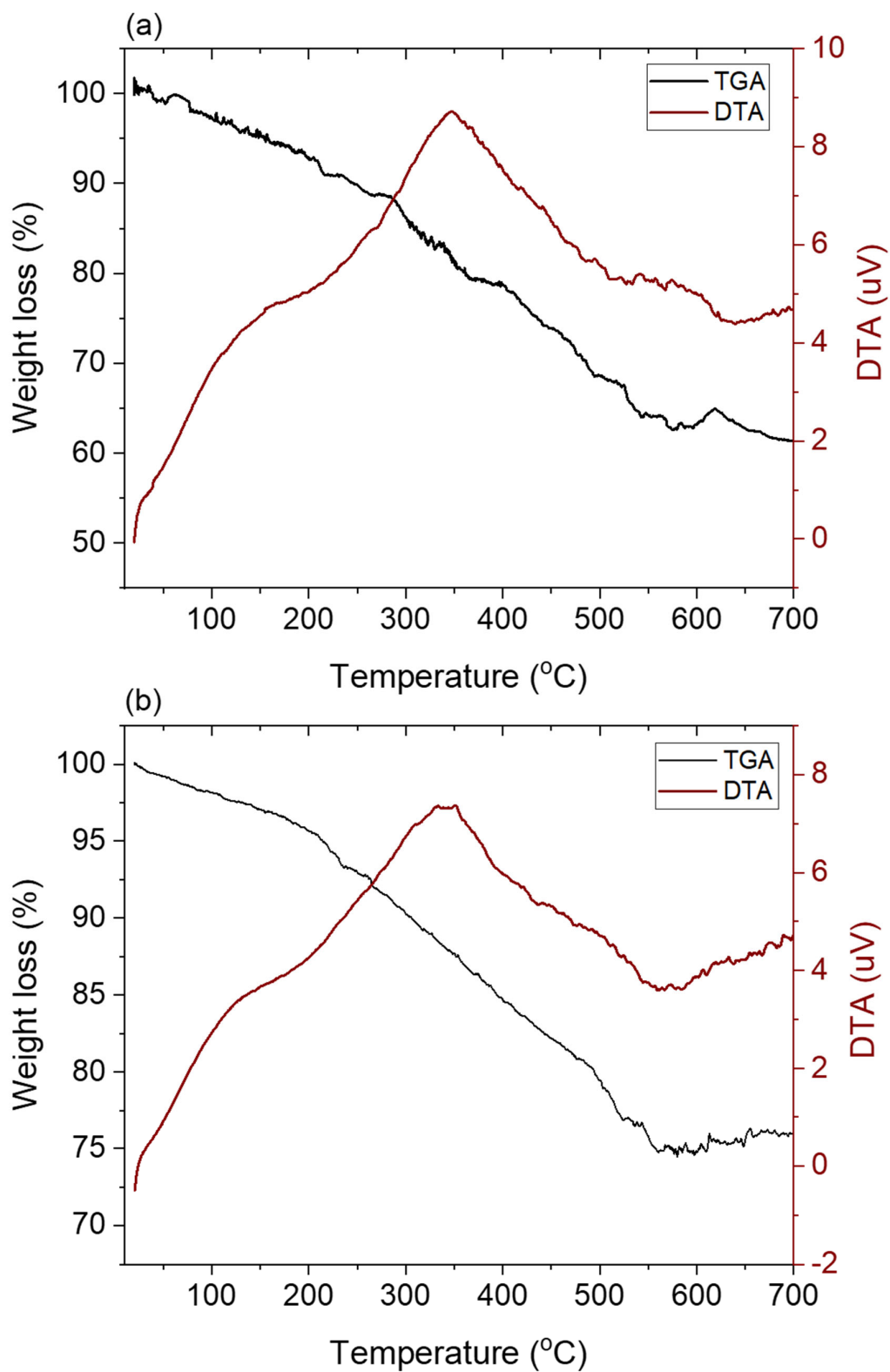


Figure S2. TGA analyses of the (a) commercial beta zeolite and (b) alkali-treated beta zeolite after the 2nd reuse in the furfural upgrading reaction.

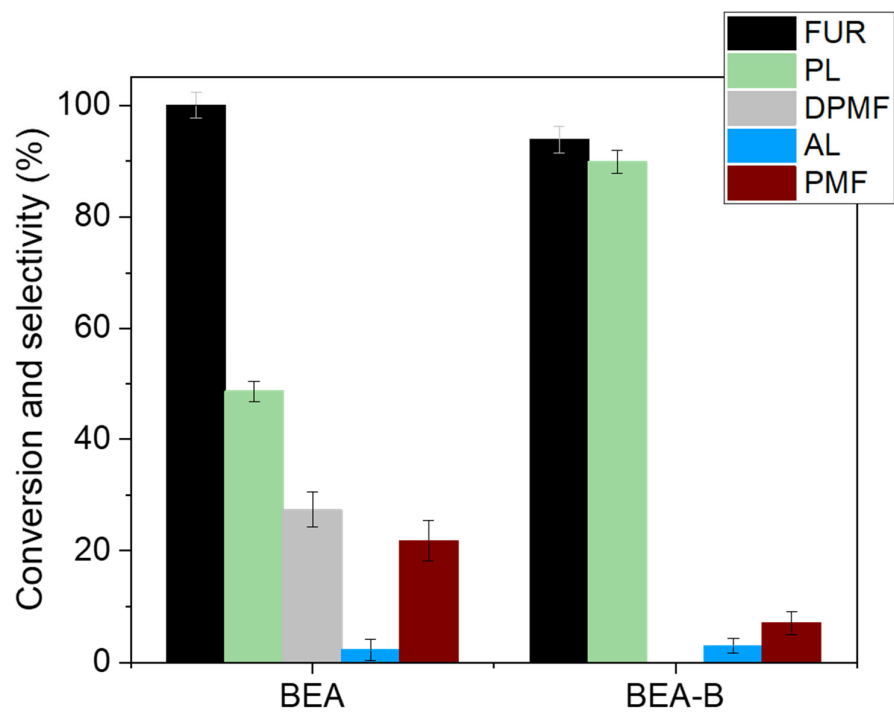


Figure S3. Experiments performed in triplicate for the commercial beta zeolite and alkali-treated beta zeolite in the furfural upgrading reaction.

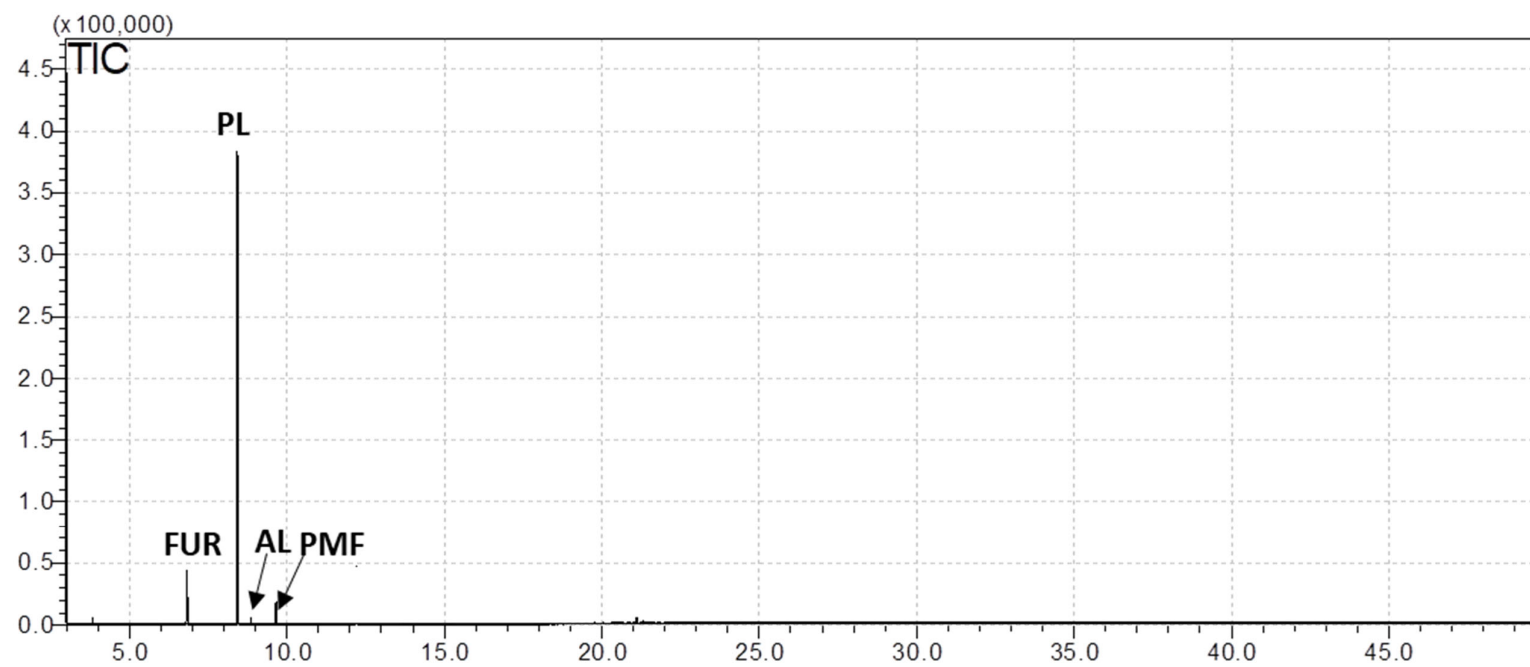


Figure S4. Typical chromatogram for the catalytic upgrading of furfural via domino reaction using BEA-B as a catalyst.

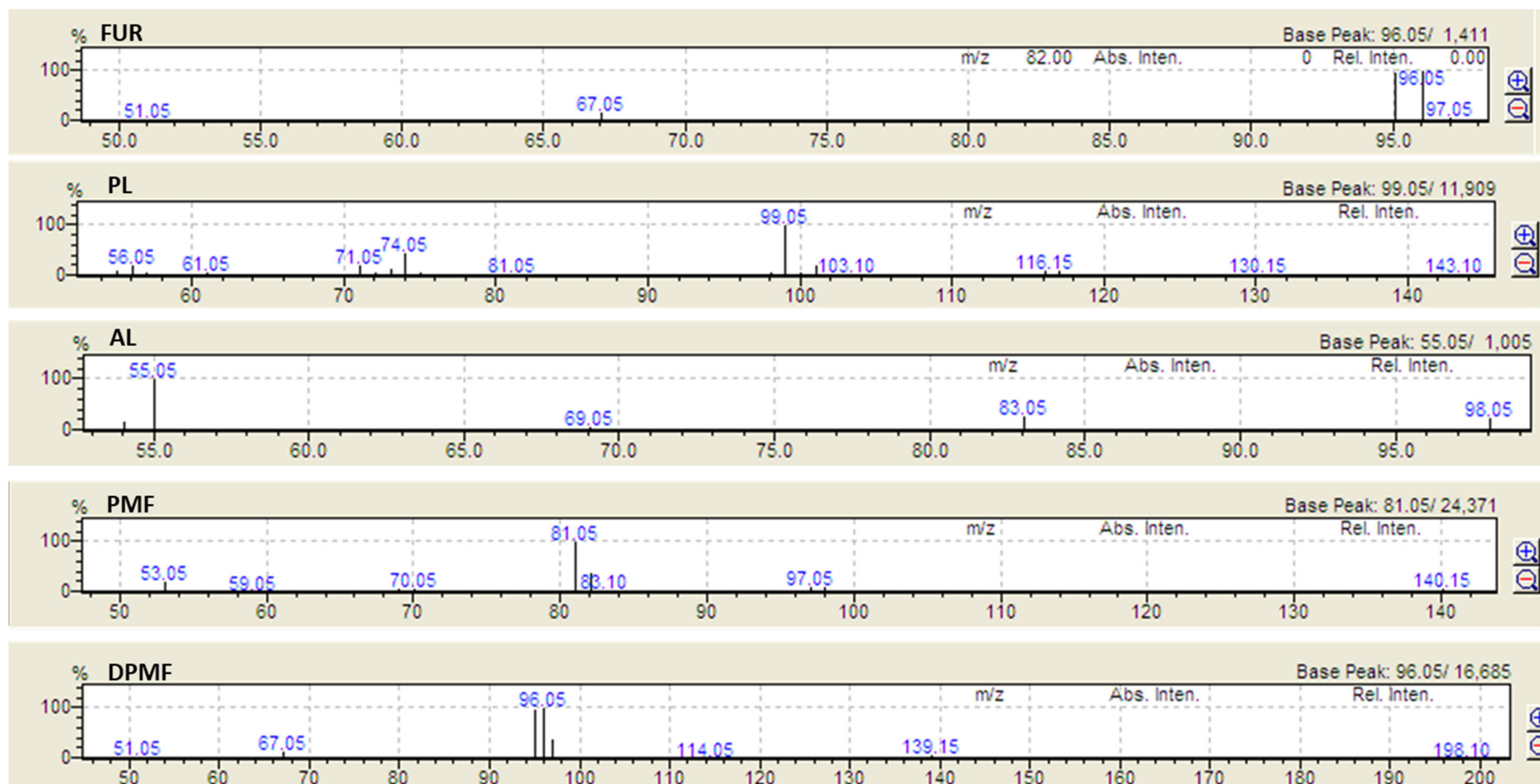


Figure S5. Mass spectra of the products detected in the catalytic upgrading of furfural via domino reaction zeolites as catalysts.

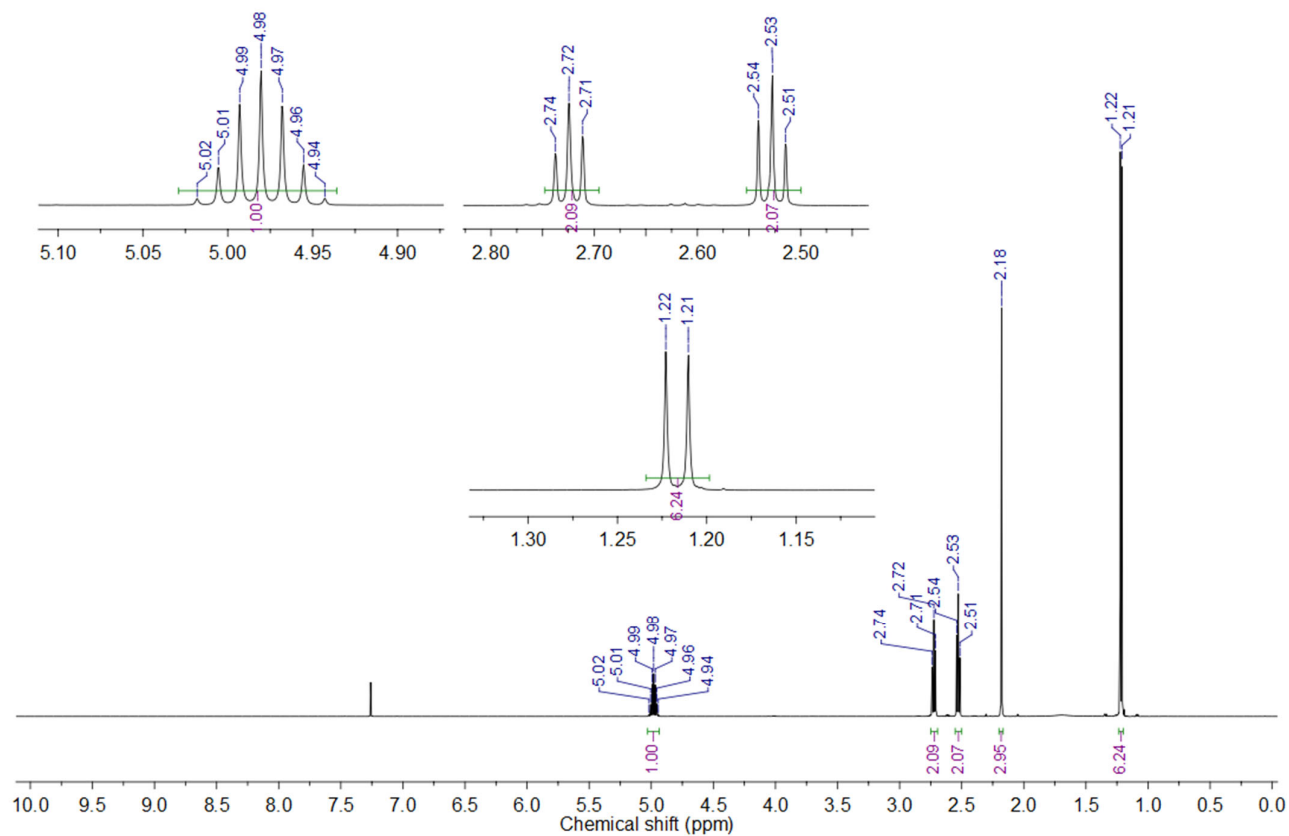


Figure S6. ^1H -NMR spectrum of isopropyl levulinate obtained from the reaction performed at optimized conditions using BEA-B as a catalyst. (500 MHz, CDCl_3). δ 4.98 (hept, $J = 6.3$ Hz, 1H), 2.72 (t, $J = 6.6$ Hz, 2H), 2.53 (t, $J = 6.6$ Hz, 2H), 2.18 (s, 3H), 1.22 (d, $J = 6.3$ Hz, 6H).

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