ELECTRONIC SUPPLEMENTARY INFORMATION

Selective synthesis of dimethoxyethane via directly catalytic etherification of crude ethylene glycol

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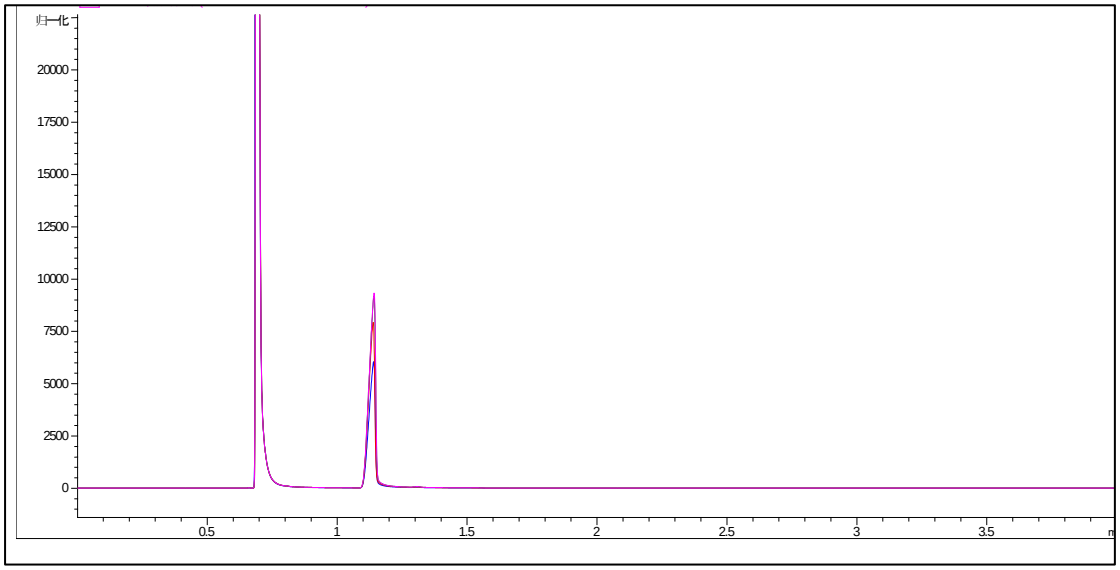

Figure S1 GC curves for etherification of EG with methanol over $Ca(OH)_2$. Four curves were overlapped, respectively standing for the reaction time of 60, 120,180 and 240min.Peaks in 0.7min and 1.14min was respectively standing for methanol and ethylene glycol.

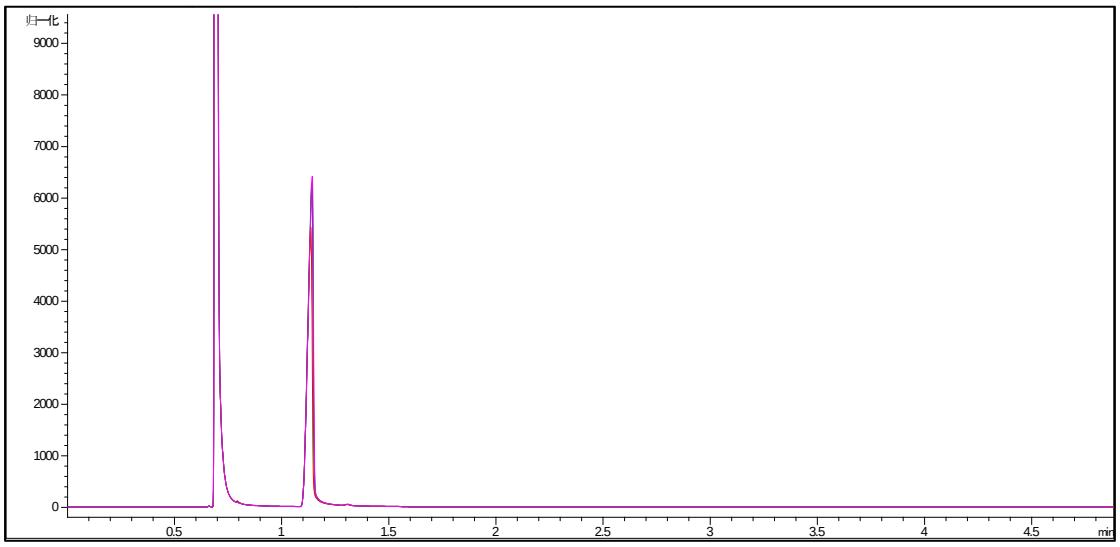

Figure S2 The continuous producing DME via etherification of EG with methanol over $Mg(OH)_2$. Four curves were overlapped, respectively standing for the reaction time of 60, 120, 180 and 240min.Peaks in 0.7min and 1.14min was respectively standing for methanol and ethylene glycol.

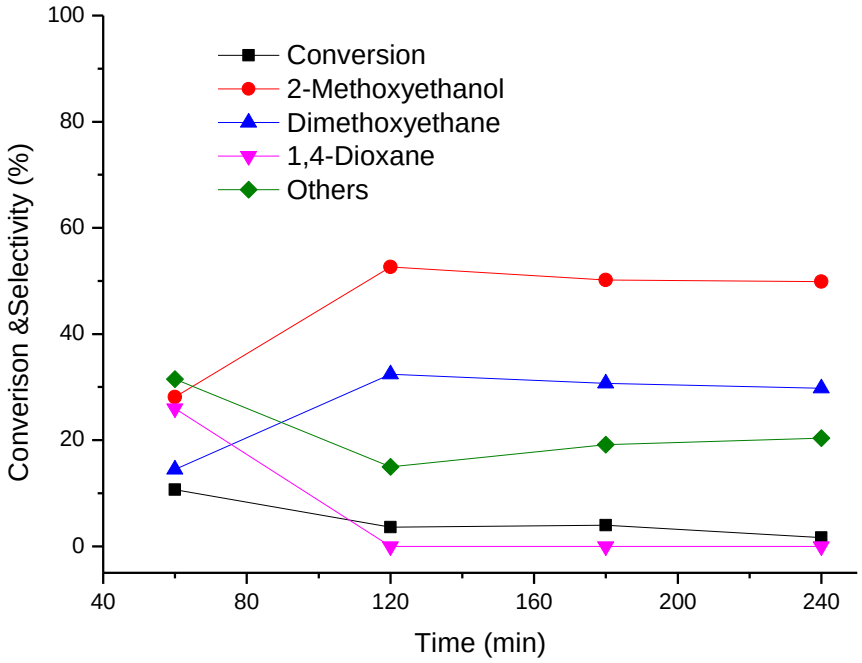

Figure S3 The continuous producing DME via etherification of EG with methanol over γ-Al_2O_3

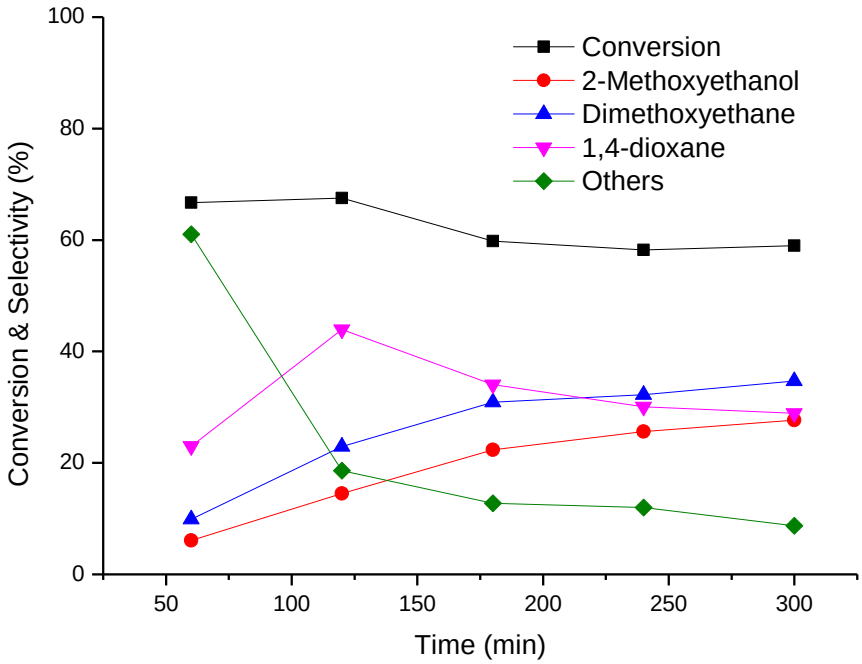

Figure S4 The continuous producing DME via etherification of EG with methanol over HY(7)

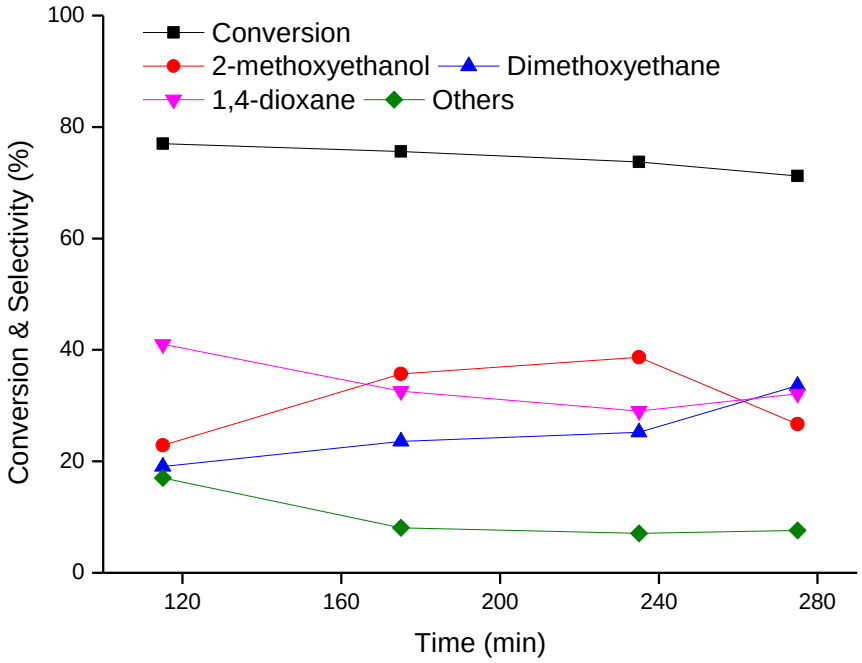

Figure S5 The continuous producing DME via etherification of EG with methanol over HY (11)

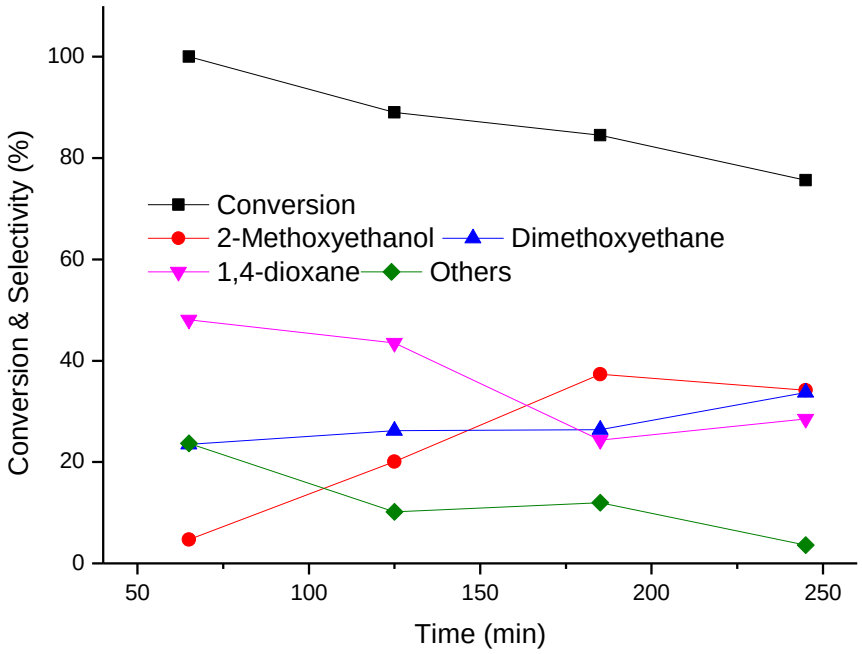

Figure S6 The continuous producing DME via etherification of EG with methanol over USY(14)

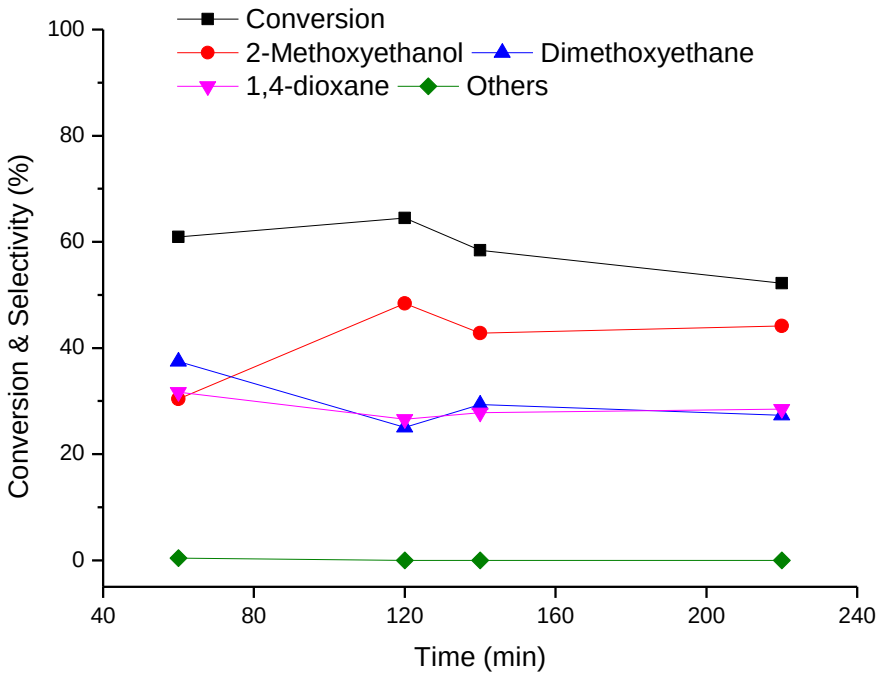

Figure S7 The continuous producing DME via etherification of EG with methanol over HZSM-5(25)

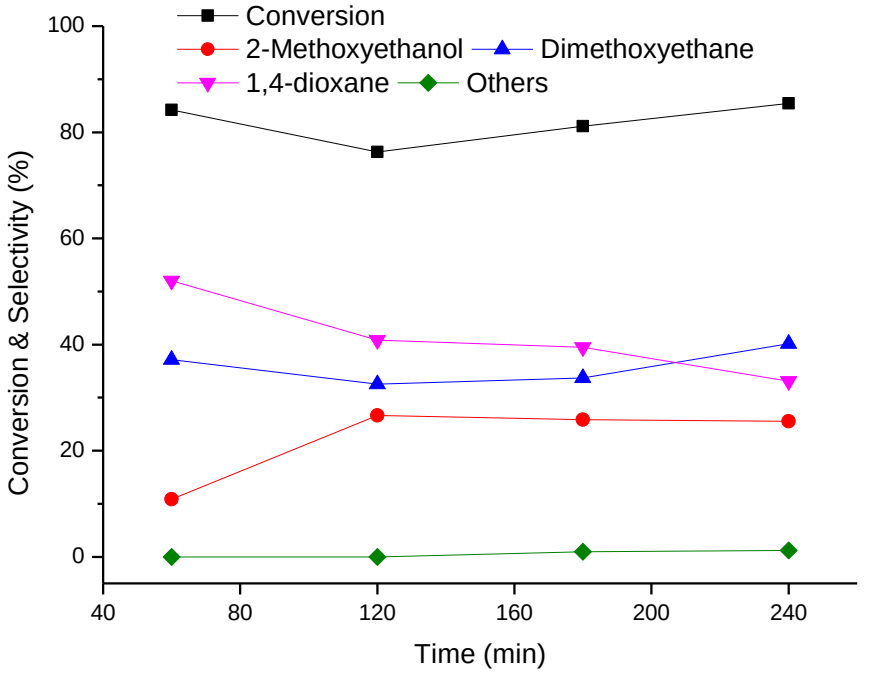

Figure S8 The continuous producing DME via etherification of EG with methanol over HZSM-5(100)

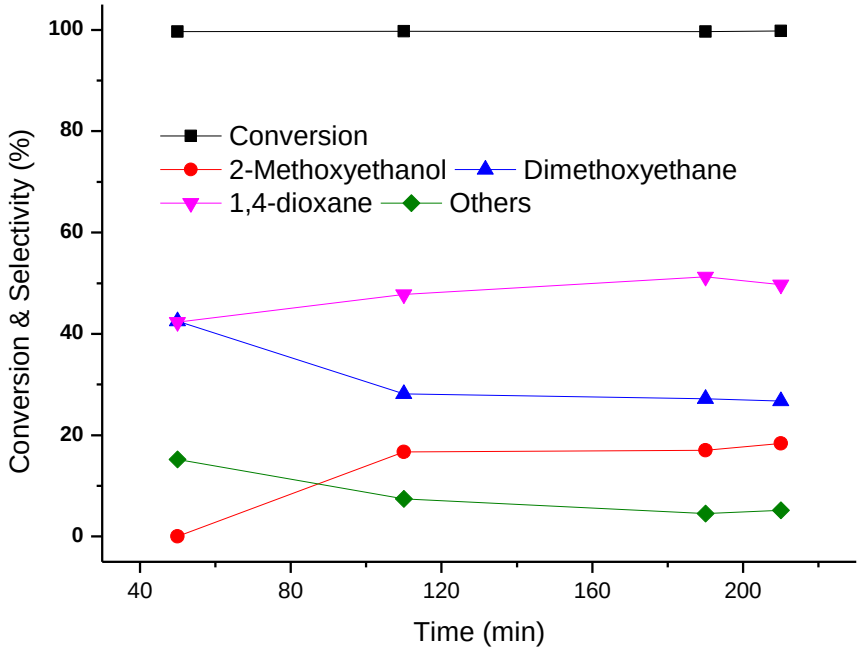

Figure S9 The continuous producing DME via etherification of EG with methanol over HZSM-5(300)

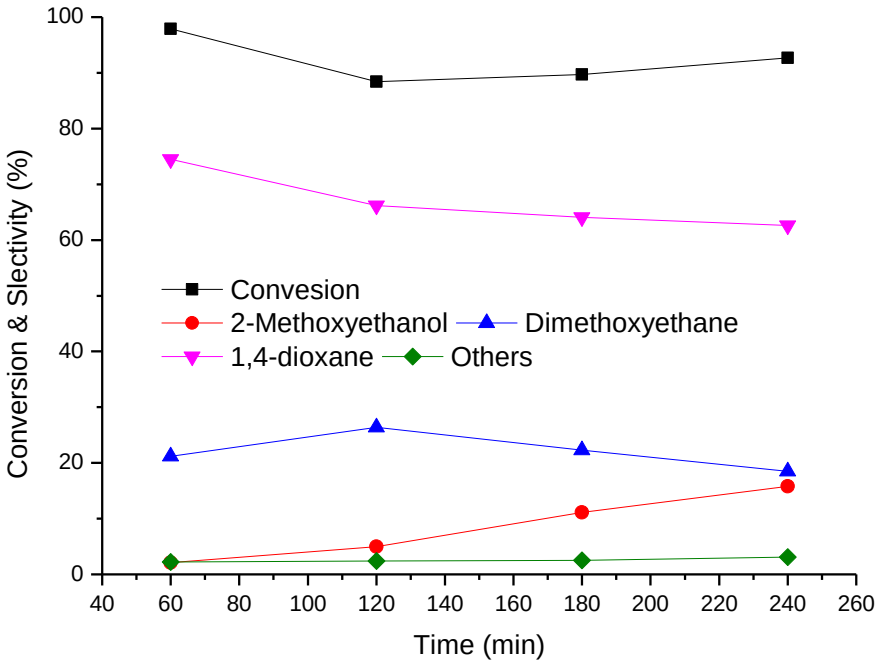

Figure S10 The continuous producing DME via etherification of EG with methanol over H-Beta (25)

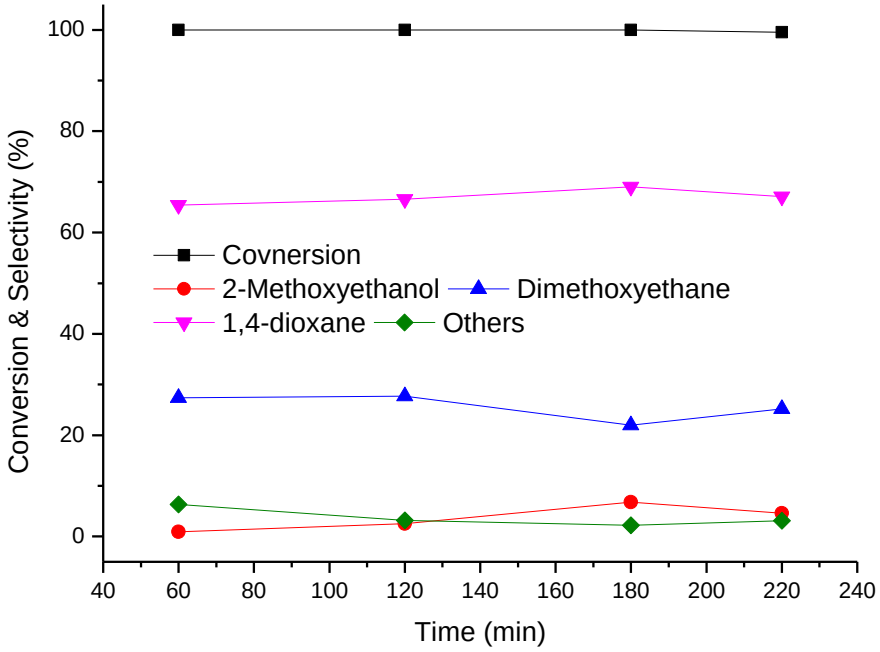

Figure S11 The continuous producing DME via etherification of EG with methanol over H-Beta (40)

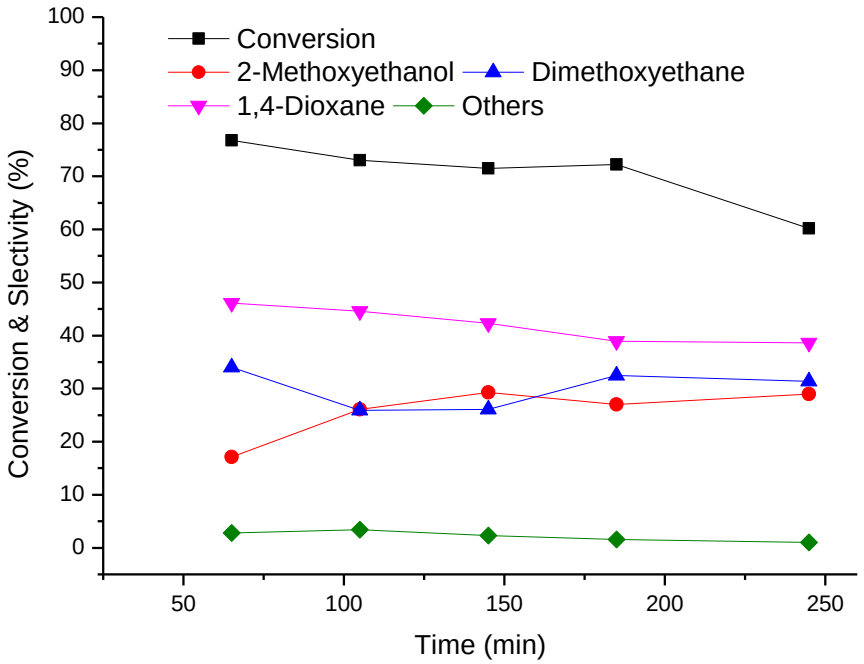

Figure S12 The continuous producing DME via etherification of EG with methanol over SAPO-11

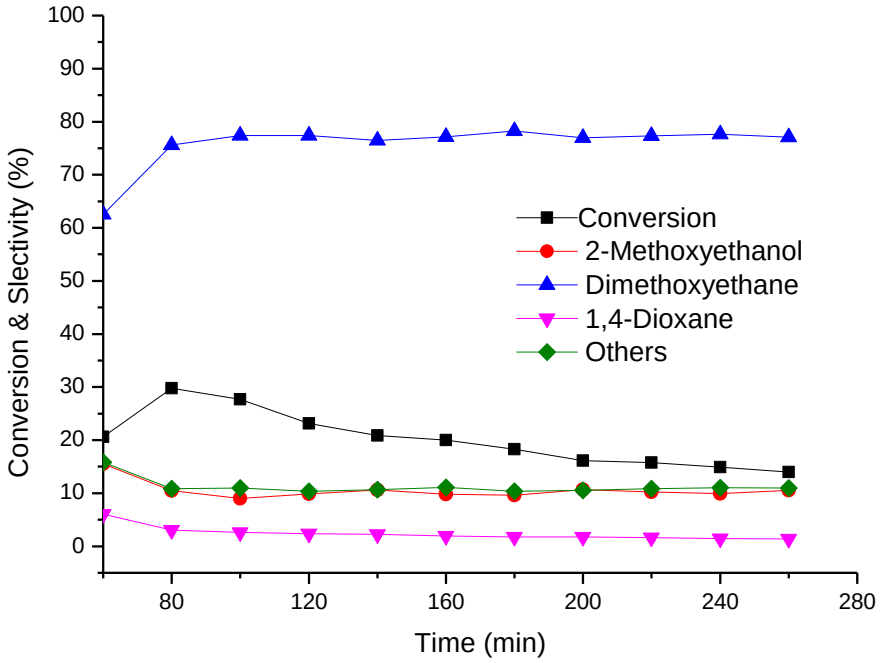

Figure S13 The continuous producing DME via etherification of EG with methanol over Mordenite

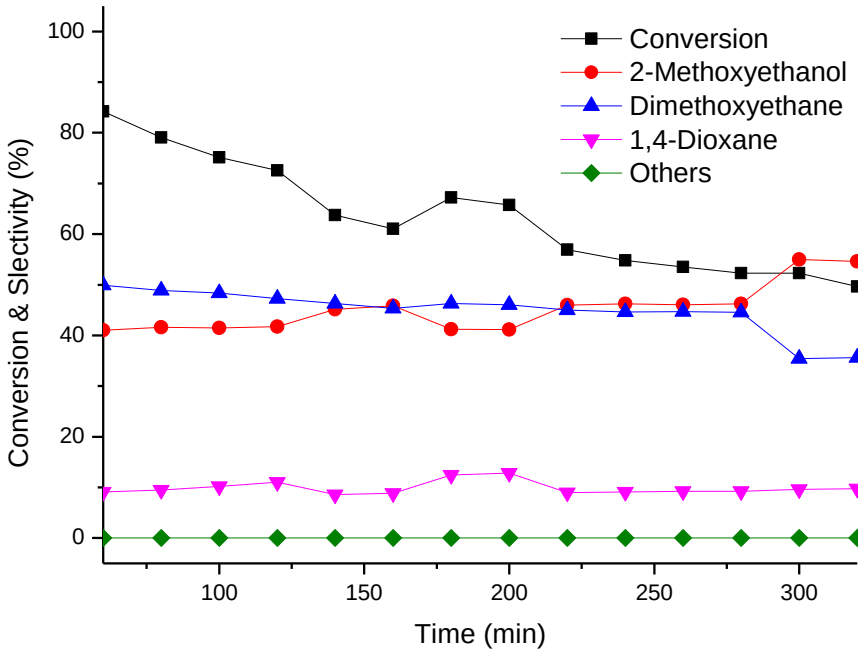

Figure S14 The continuous producing DME via etherification of EG with methanol over HZSM-35 (30)

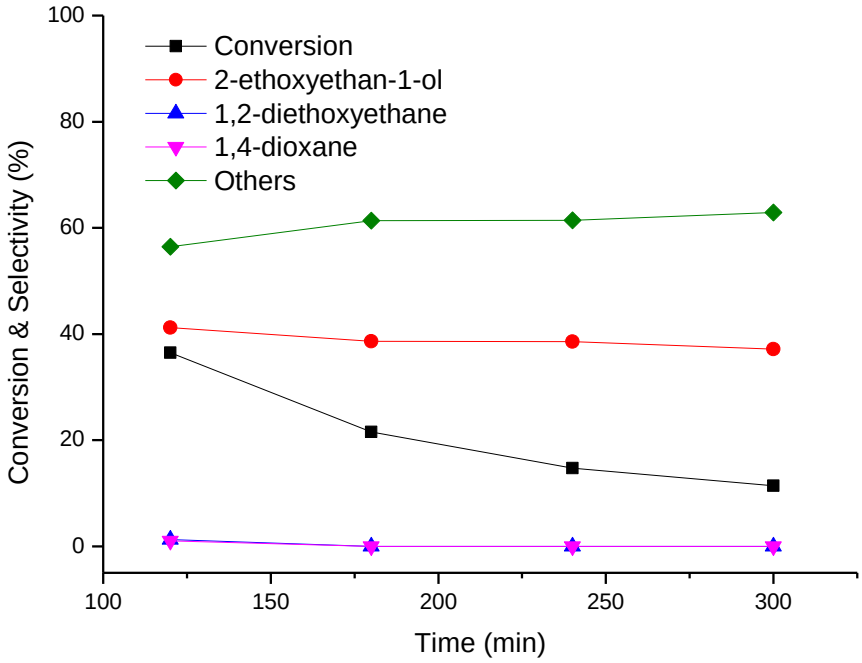

Figure S15 The continuous producing DME via etherification of EG with ethanol over SAPO-34

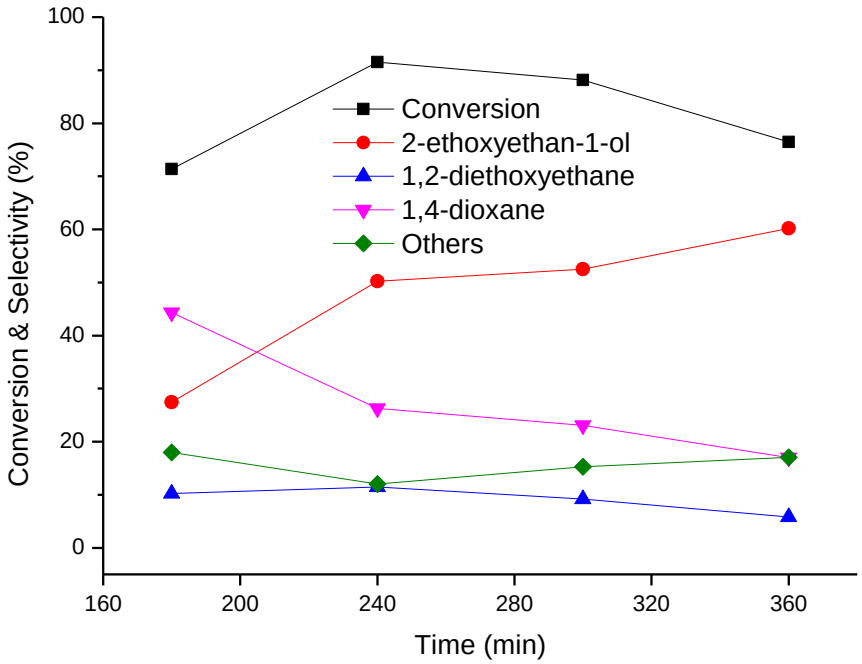

Figure S16 The continuous producing DME via etherification of EG with ethanol over HY (7)

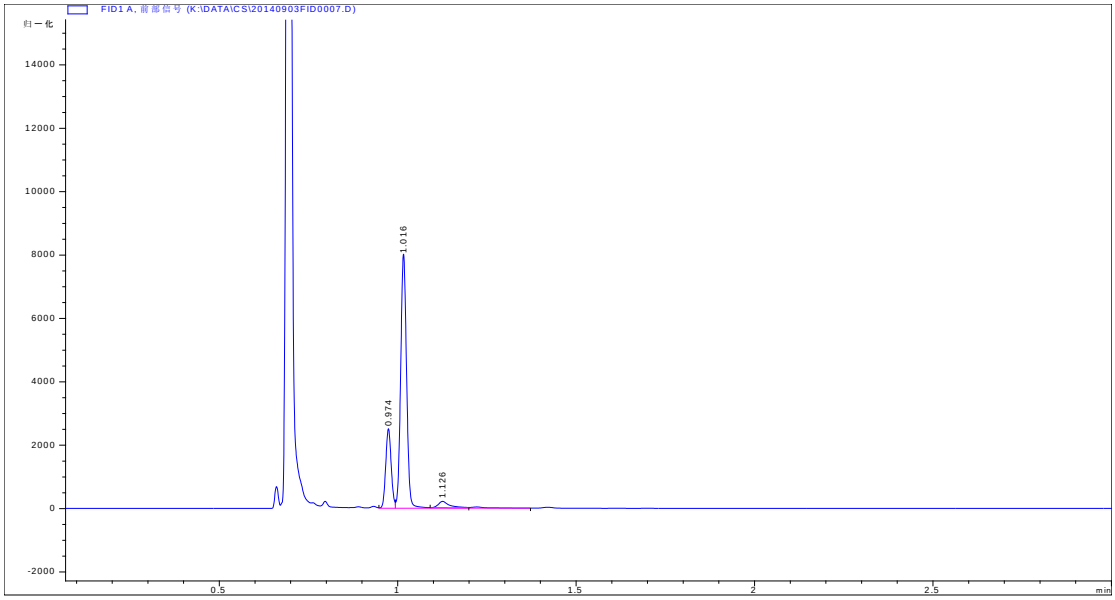

Figure S17 GC curve for etherification of EG with methanol over SAPO-34. Peaks in 0.97min, 1.02min and 1.13 were respectively standing for 2-methoxyethanol, dimethoxyethane and ethylene glycol. 1,4-dioxane was not detected.

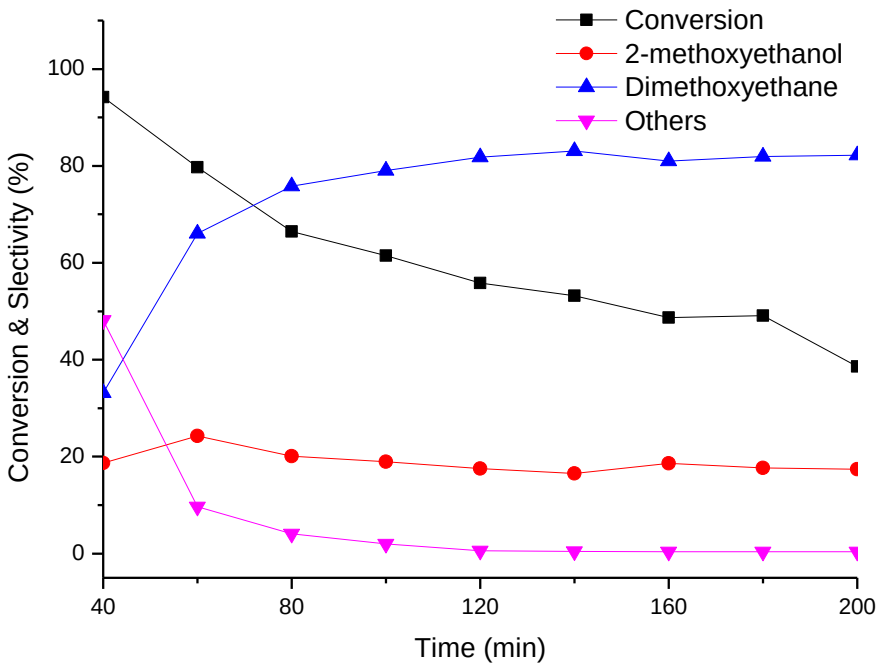

Figure S18 Catalytic performance of regenerated catalyst in catalytic etherification of EG with methanol. Reaction conditions: 483 K, 0.3 MPa N_2, LHSV = 1.5 h^{-1}.

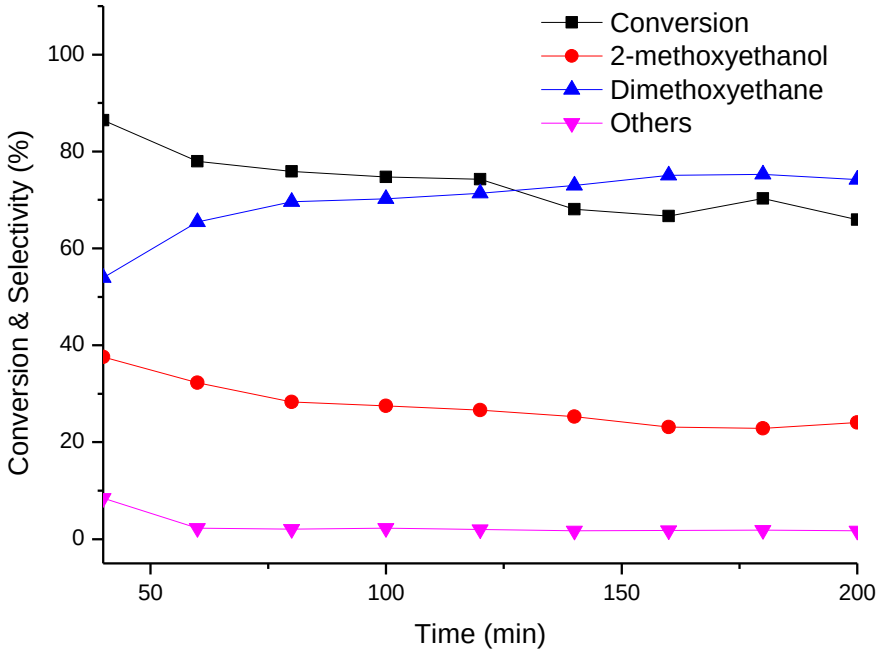

Figure S19 Catalytic performance of ball-milled catalyst in catalytic etherification of EG with methanol. Reaction conditions: 483 K, 0.3 MPa N_2, LHSV = 1.5 h^{-1}.