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二氧化硅负载的不同碱金属硝酸盐催化乳酸缩合反应制备2,3-戊二酮的催化性能比较研究

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Comparative Study on Catalytic Performance of the Production of 2,3-Pentanedione from Lactic Acid Condensation over SiO2-Supported Alkali Metal Nitrates

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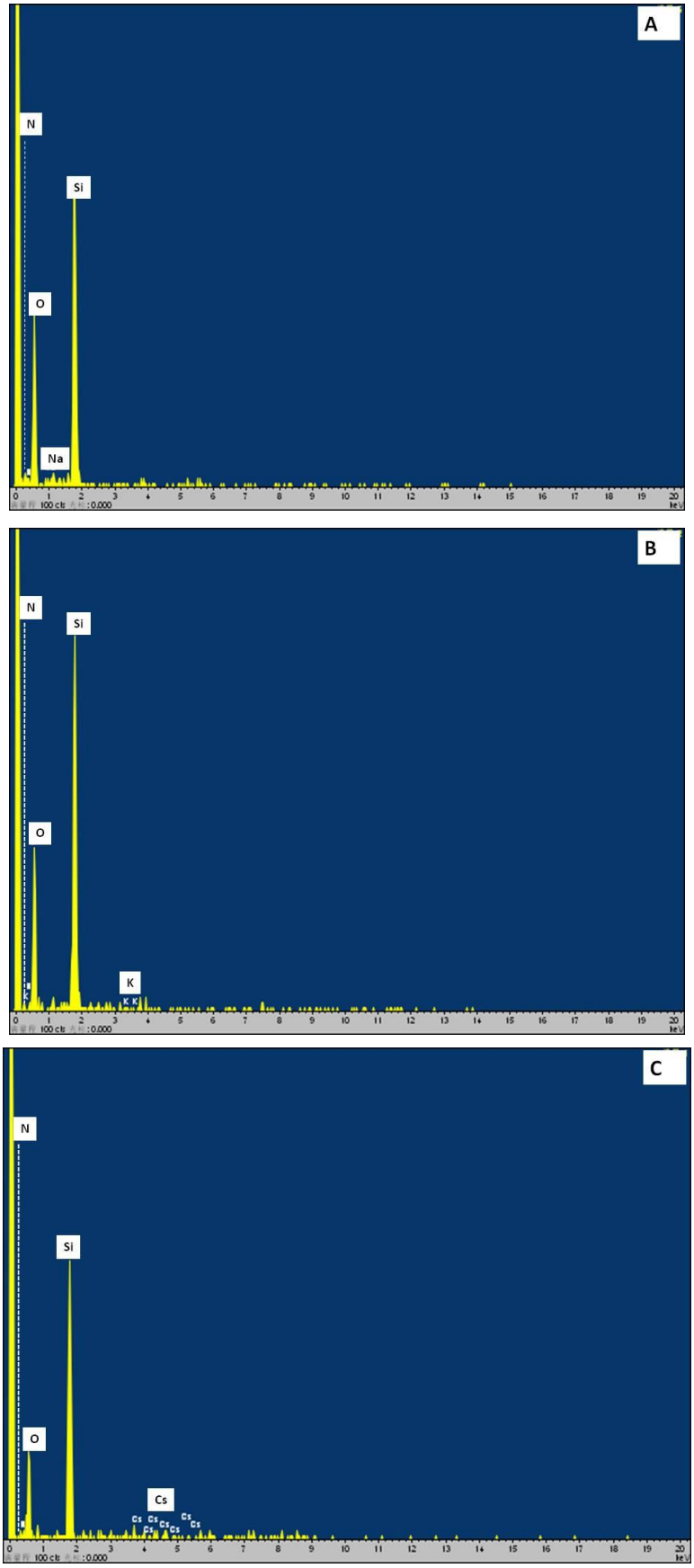

Fig.S1 EDX analysis of 2.2% (*x*, molar fraction)MNO_3/SiO_2 catalysts

(A) 2.2% $NaNO_3/SiO_2$; (B) 2.2% KNO_3/SiO_2; (C) 2.2% $CsNO_3/SiO_2$

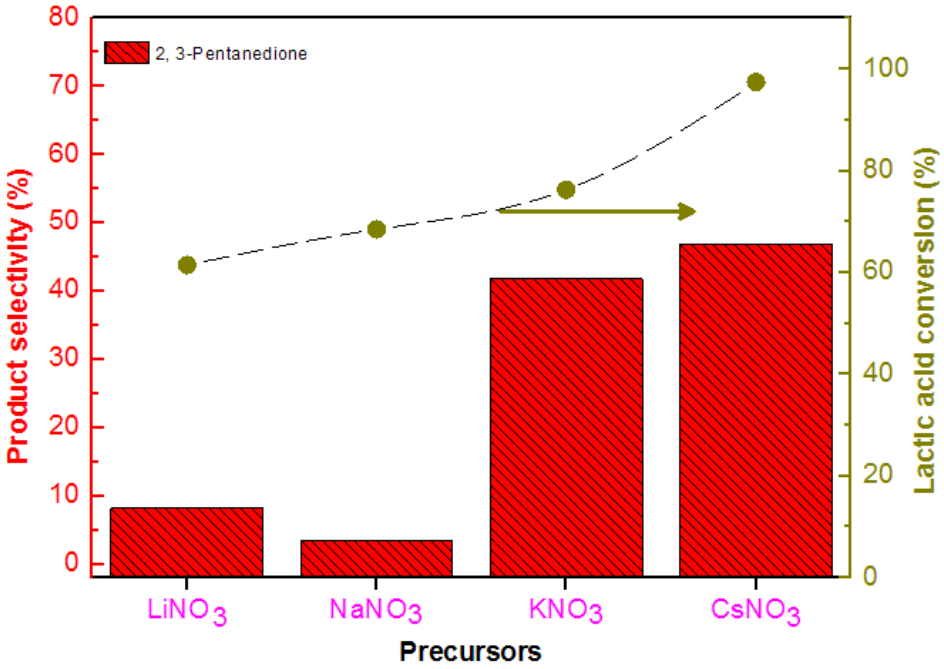

Fig.S2 Comparison of different precursors

conditions: loading amount, 0.40–0.43 g, 2.2% (*x*, molar fraction) MNO_3/SiO_2 (M = Li, Na, K, Cs); reaction temperature, 300 ℃; feedstock, 20% (*w*, mass fraction); feed flow rate, 1.0 mL h^{-1}; carrier gas, 1 mL min^{-1}; TOS, 2–7 h

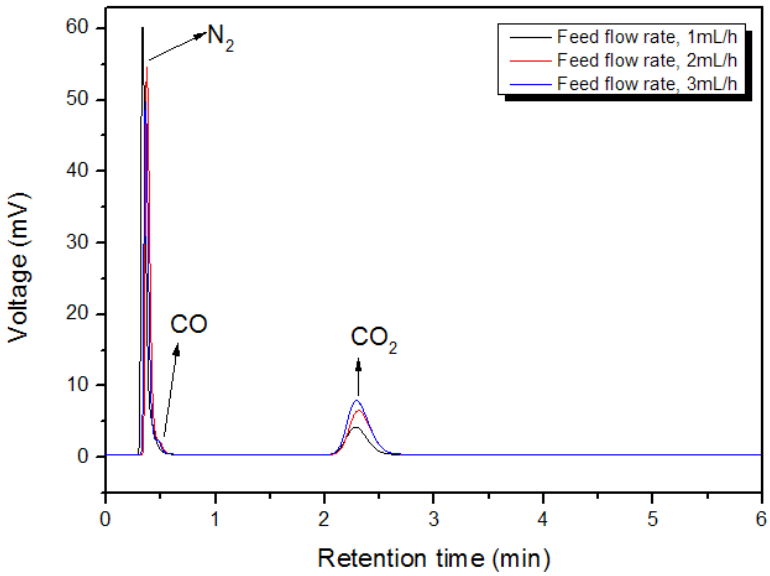

Fig.S3 Gas-chromatography profile of tail gas

conditions: catalyst, 0.45 g, 4.4% (*x*) $CsNO_3/SiO_2$; feedstock, 20% (*w*, mass fraction); carrier gas, 1 mL min^{-1}; reaction temperature, 300 ℃

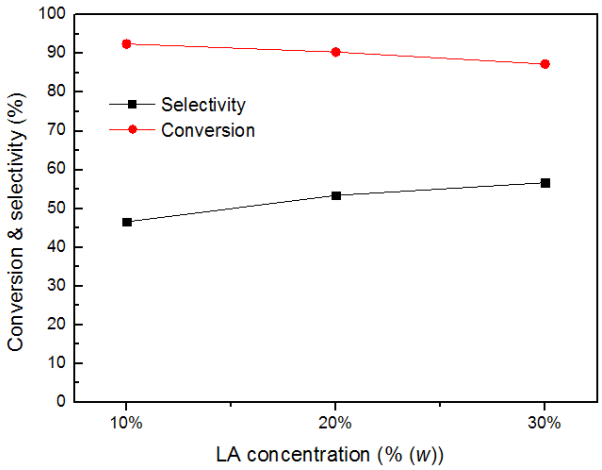

Fig.S4 Effect of LA concentration on reaction performance

conditions: catalyst, 0.45 g, 4.4% (*x*) $CsNO_3/SiO_2$; feed flow rate, 1.0 mL h^{-1}; carrier gas, 1 mL min^{-1}; reaction temperature, 300 ℃. LA: lactic acid

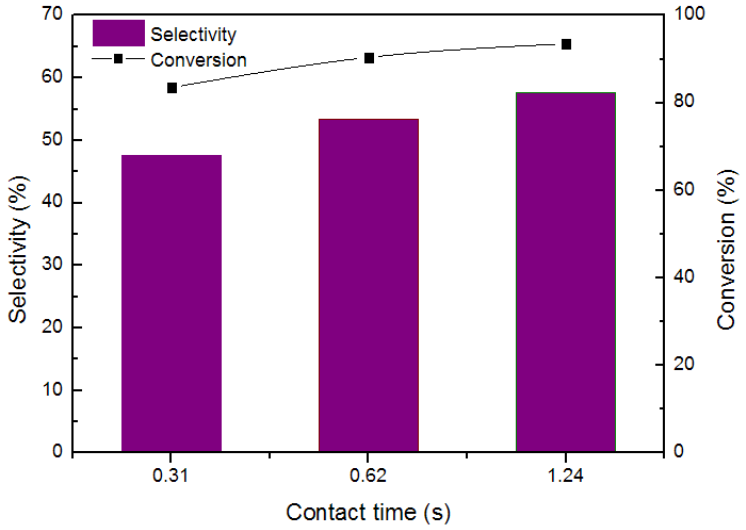

Fig.S5 Effect of LA concentration on reaction performance

conditions: catalyst, 0.45 g, 4.4% (*x*) $CsNO_3/SiO_2$; LA, 20% (*w*); carrier gas, 1 mL min^{-1}; reaction temperature, 300 ℃