Supplementary Information

Selective preparation and reaction kinetics of dimethyl carbonate from alcoholysis of methyl carbamate with methanol over ZnAl-LDO

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Table S1. The CO_2-TPD results of ZAO-X catalysts.

Sample	Desorption temperatures 1 (K)	Basicity (mmol/g)	Desorption temperatures 2 (K)	Basicity (mmol/g)
ZAO-773	645.4	0.08383	913.9	0.3459
ZAO-873	638.4	0.07953	927.3	0.2724
ZAO-973	698.9	0.06706	920.0	0.1682

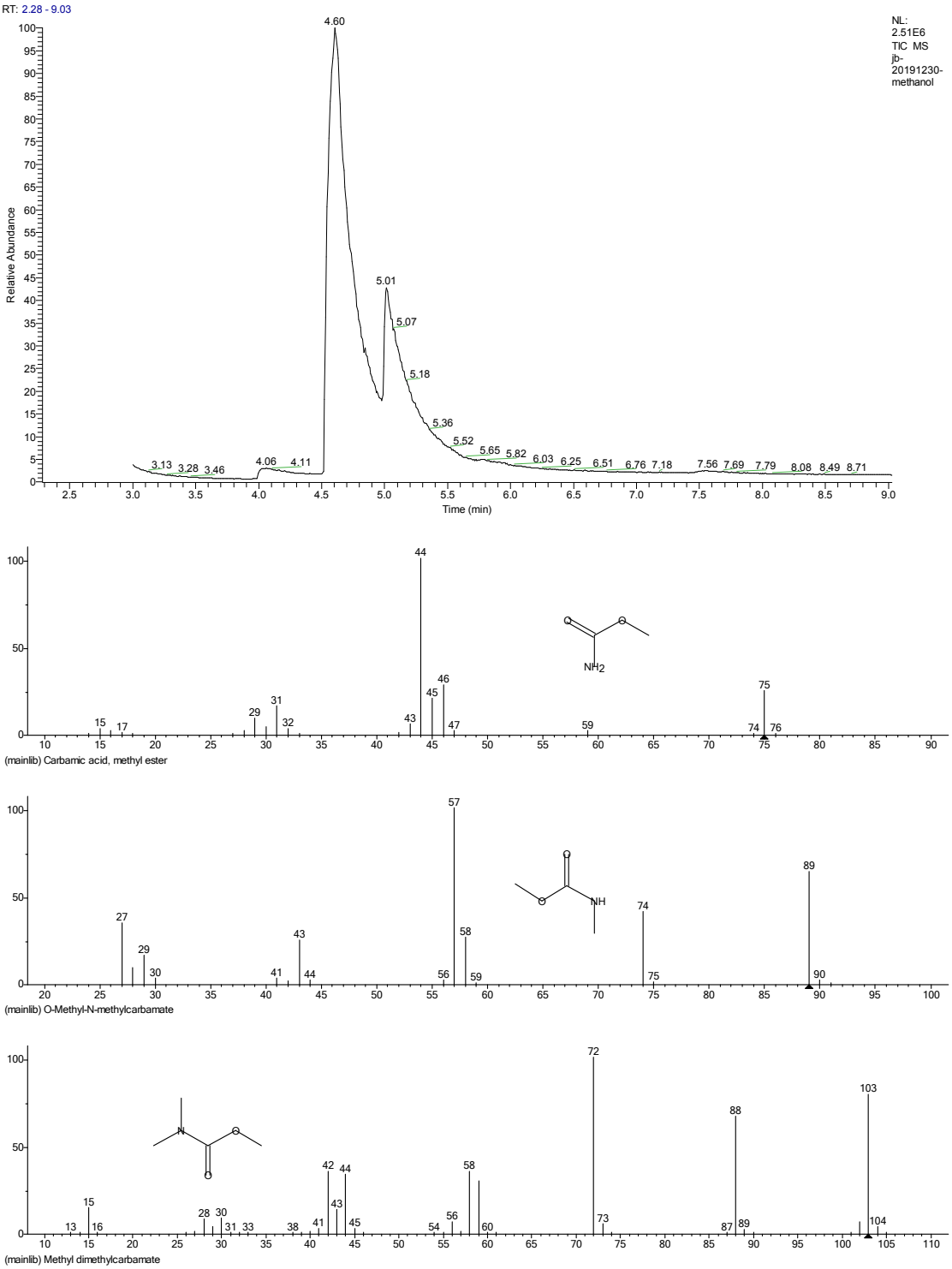

Fig. S1. Total ion chromatogram from the GC-MS analysis and the standard mass spectrogram with retention time of 4.06, 4.60 and 5.01 min, respectively.

Table S2. The rate constants at different temperatures of Langmuir-Hinshelwood kinetic model.

Rate constants	Temperature/K			
	433	443	453	473
k_1	0.1899	0.2783	0.4009	0.7139
k_2	0.0430	0.0741	0.1663	0.7016
k_3	0.0046	0.0082	0.0167	0.0451
k_4	0.0007	0.0019	0.0069	0.0787
k_5	0.0389	0.0782	0.1199	0.3472
k_{DMC}	0.1181	0.1594	0.2662	0.6368
k_{MC}	0.4547	0.7246	0.7999	0.8390
k_{NMMC}	0.0196	0.0390	0.0787	0.1986
k_{CH3OH}	0.1631	0.2578	0.4217	0.6745
n_1	0.18			
n_2	1.58			

Table S3. The rate constants at different temperatures of elementary reaction.

Rate constants	Temperature/K			
	433	443	453	473
k_1	0.0019	0.0045	0.0163	0.1129
k_2	0.0018	0.0043	0.0121	0.1281
k_3	0.0036	0.0056	0.0085	0.0197
k_4	0.0000	0.0001	0.0008	0.1074
k_5	0.0005	0.0016	0.0040	0.0565

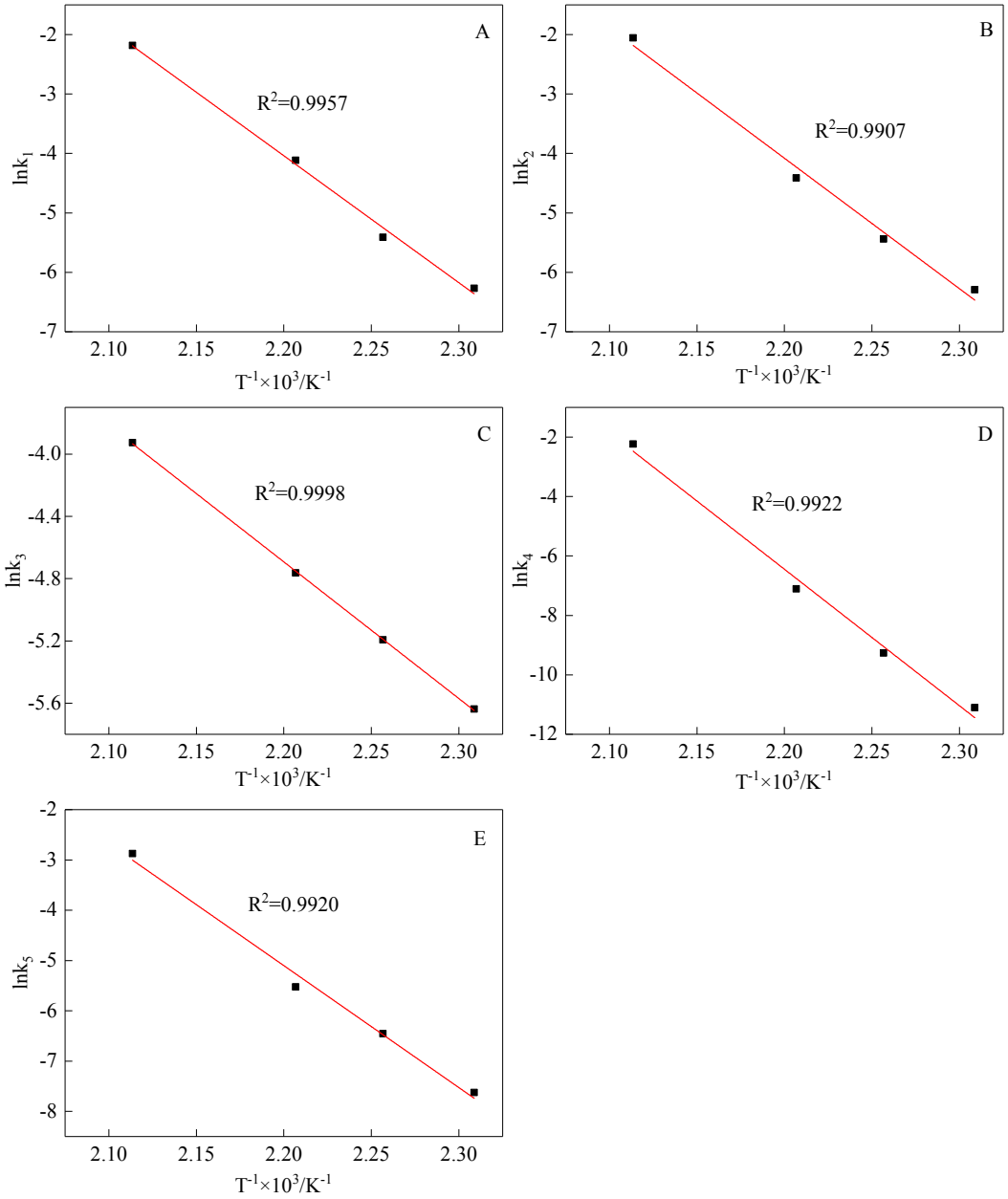

Fig. S2. The dependence of the rate constant k_i (i=1-5) on the reaction temperature for elementary reaction.

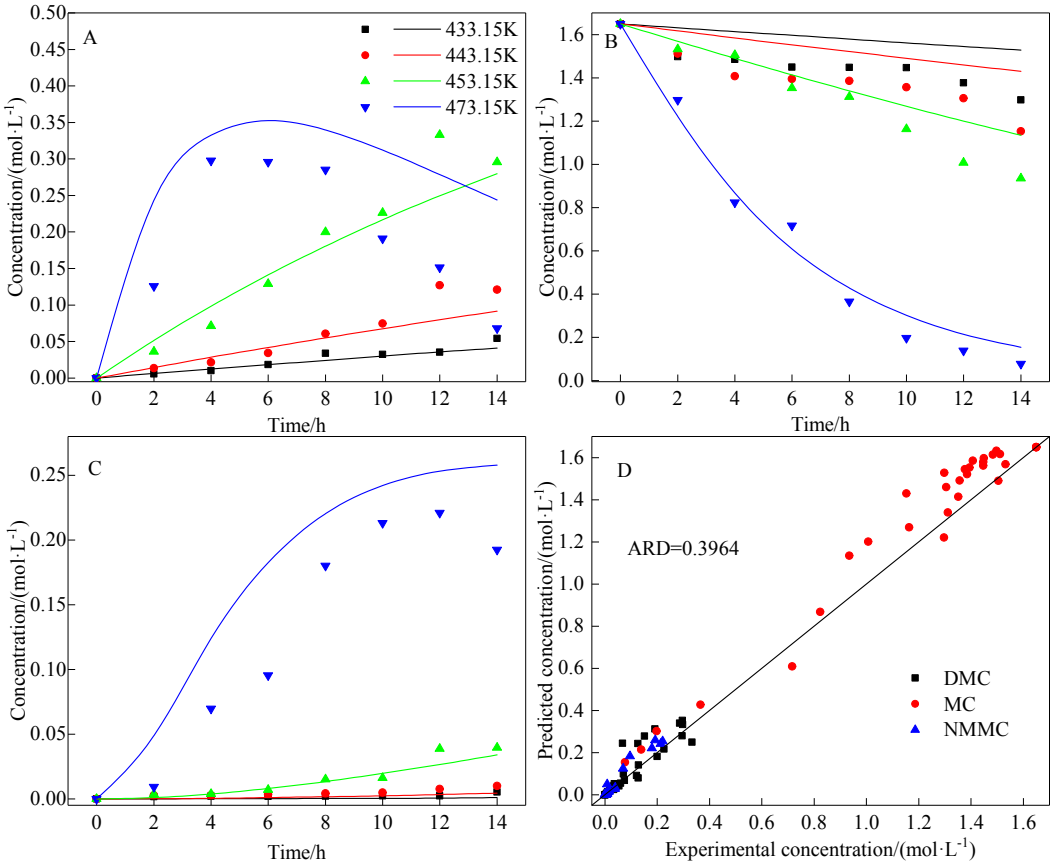

Fig. S3. Experimental value and predicted concentration curve of DMC (A), MC (B), NMMC (C) for elementary reaction at different temperature and comparison between experimental and predicted value for all points (D).

Table S4. The rate constants at different temperatures and the value of reaction orders of non-elementary reaction.

Rate constants	Temperature/K			
	433	443	453	473
k_1	0.0022	0.0063	0.0216	0.1048
k_2	0.0277	0.0496	0.0783	0.1830
k_3	0.0032	0.0039	0.0048	0.0064
k_4	0.0018	0.0040	0.0091	0.0585
k_5	0.0010	0.0036	0.0193	0.2432
n_1=0.55, n_2=0.74, n_3=1.85, n_4=1.07, n_5=0.70, n_6=0.95, n_7=1.27				

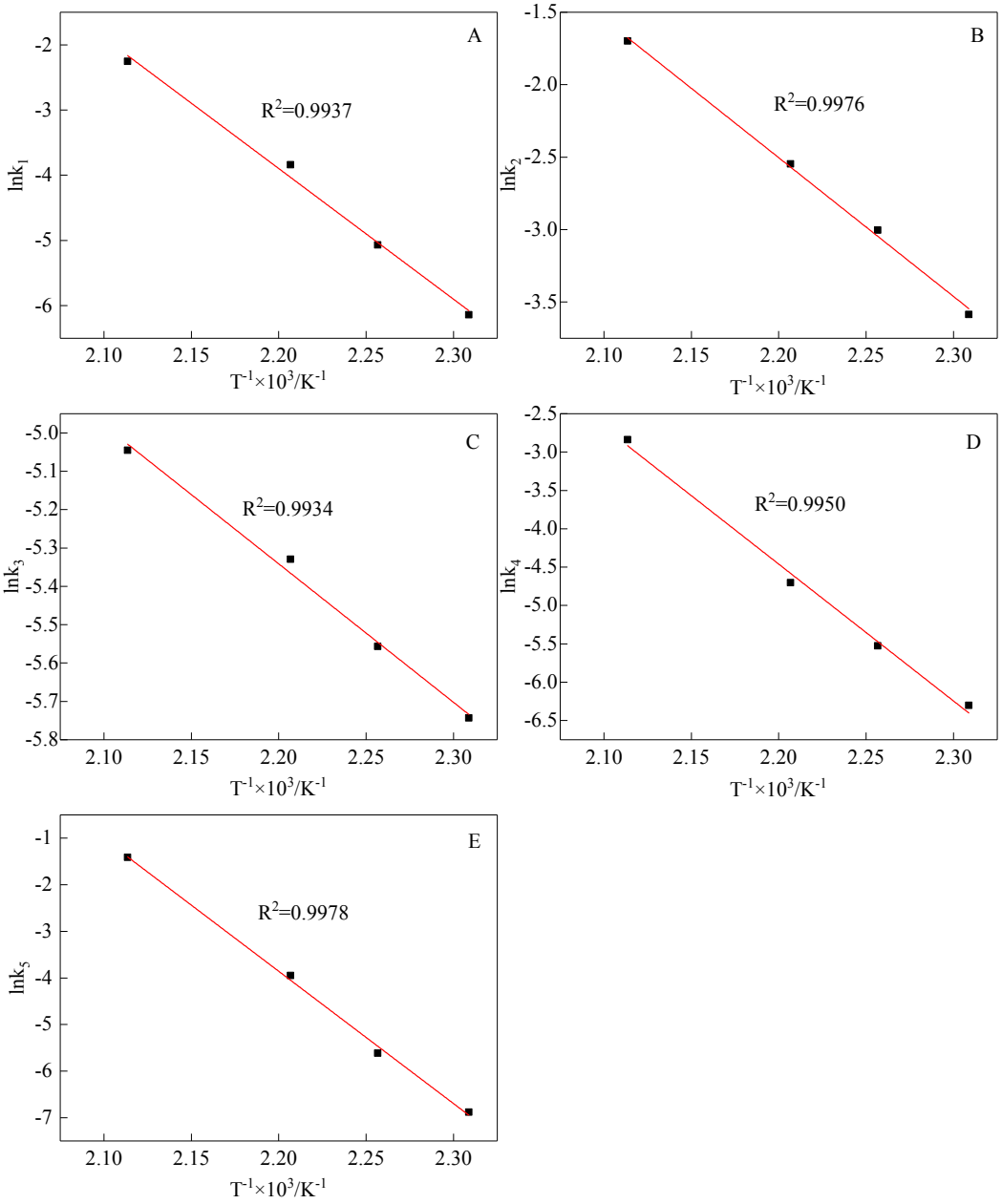

Fig. S4. The dependence of the rate constant k_i (i=1-5) on the reaction temperature for non-elementary reaction.

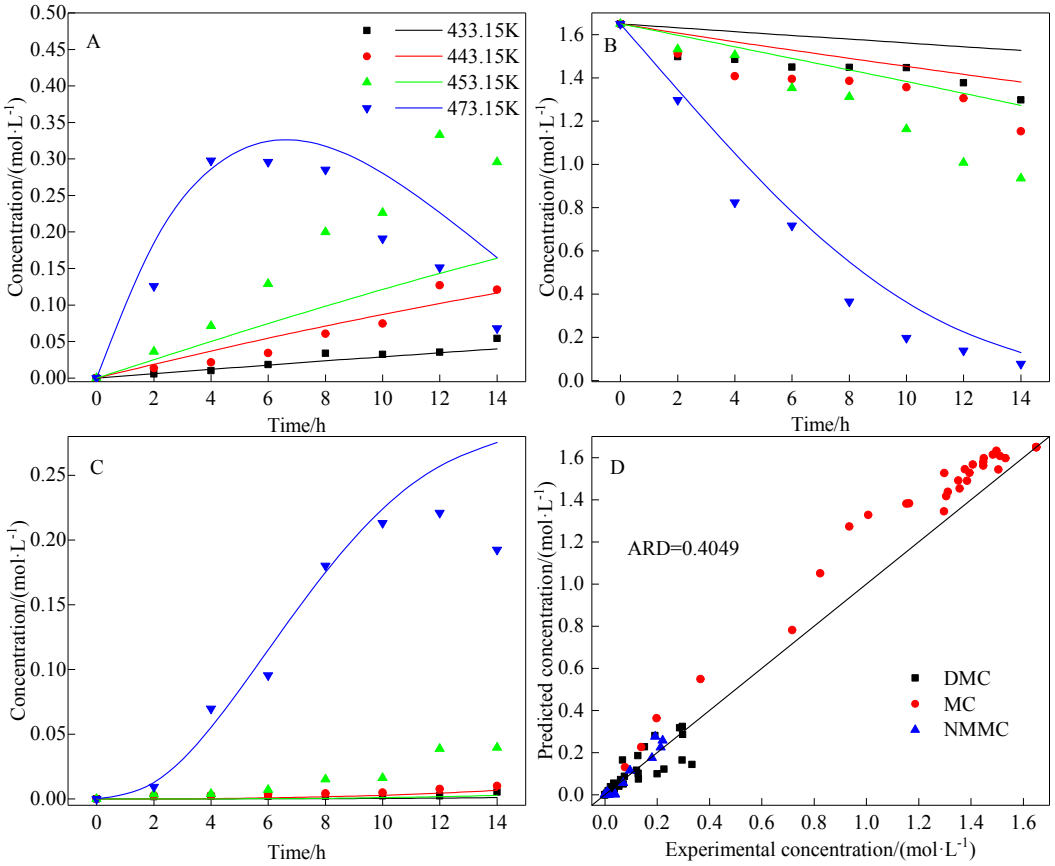

Fig. S5. Experimental value and predicted concentration curve of DMC (A), MC (B), NMMC (C) for non-elementary reaction at different temperature and comparison between experimental and predicted value for all points (D).