

Supplementary Materials

# Synthesis, Characterization and Catalytic Evaluation of Chromium Oxide Deposited on Titania–Silica Mesoporous Nanocomposite for the Ethane Dehydrogenation with CO<sub>2</sub>

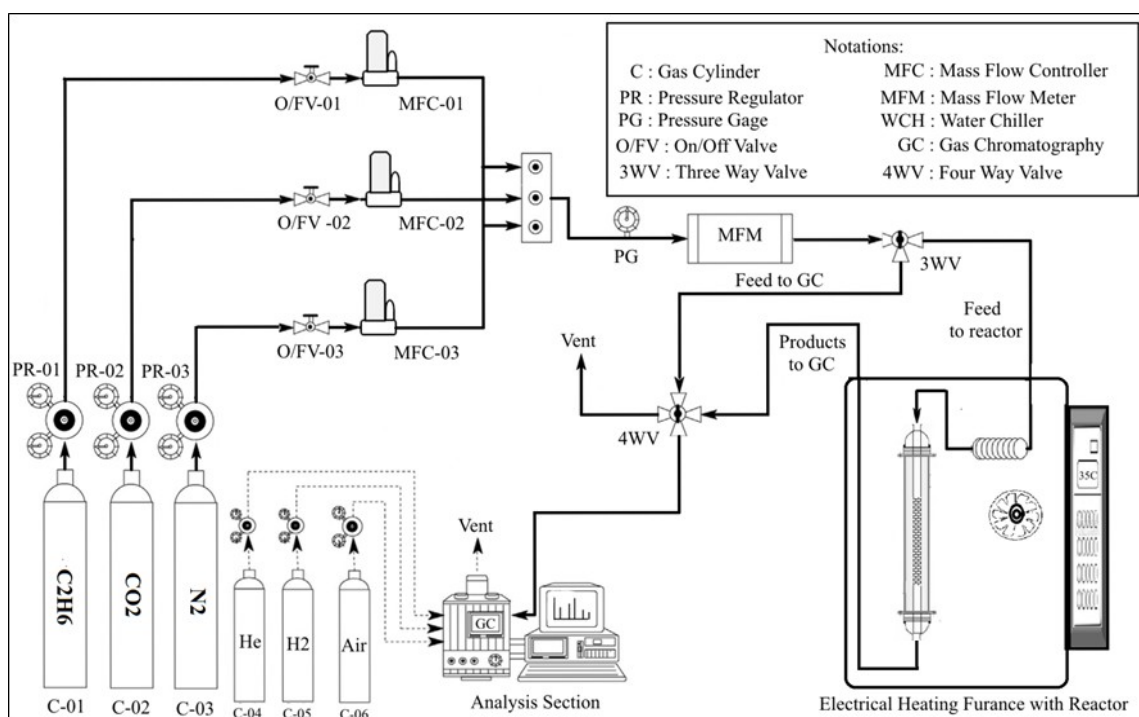
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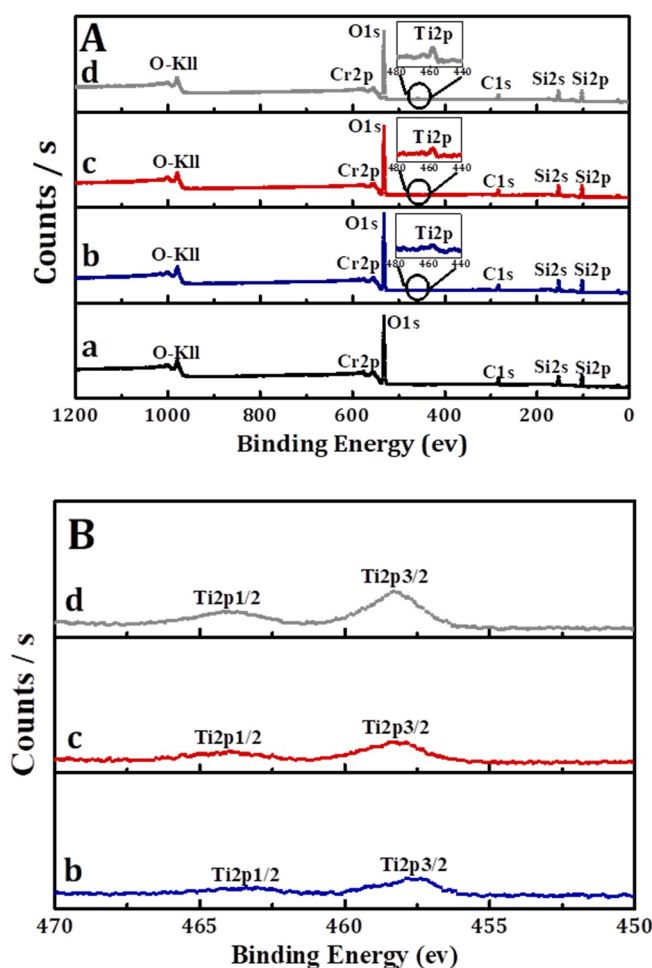
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**Figure S1.** Experimental setup for the oxidative dehydrogenation (ODH) of C<sub>2</sub>H<sub>6</sub> with CO<sub>2</sub>.



**Figure S2.** (A) XPS survey spectra of Cr(8)/MCM-41(I) and Cr(8)/Ti(x)-Si-Composite and (B) Ti2p XPS spectrum of Cr(8)/Ti(x)-Si-Composite prepared with varying titanium loading, where x (a) 0.0 (b)2.2, (c) 5.3, and (d) 9.2 Ti wt %.

**Table S1.** Comparison of catalytic performance of various catalysts for ethane dehydrogenation with CO<sub>2</sub>.

Catalyst	Reaction Conditions				Catalytic Activity			Ref.s
	T* (°C)	Flow rate (mL/min)	Catalyst weight (g)	Feed Composition	Ethane Conversion (%)	Ethylene Selectivity (%)	Ethylene Yield (%)	
Cr(8)/Ti(2.2)-Si	700	45	0.3	C <sub>2</sub> H <sub>6</sub> /CO <sub>2</sub> /N <sub>2</sub> =1/5/4	52.3	91.8	48	Present study
<b>Eco-catalyst</b>								
La(10)/γ-Al <sub>2</sub> O <sub>3</sub>		25	0.7mL	C <sub>2</sub> H <sub>6</sub> /CO <sub>2</sub> =50/50	37.5	20.8	19.8	[1]
Pd(0.1)/γ-Al <sub>2</sub> O <sub>3</sub>		25	0.7mL	C <sub>2</sub> H <sub>6</sub> /CO <sub>2</sub> =50/50	30	46.7	15.9	[1]
Au(1)/TiO <sub>2</sub>	650	12	NG	C <sub>2</sub> H <sub>6</sub> /CO <sub>2</sub> =50/50	40.60	85.8	NG	[2]
Ga <sub>2</sub> O <sub>3</sub> (5)/TiO <sub>2</sub>	650		0.2	C <sub>2</sub> H <sub>6</sub> /CO <sub>2</sub> =17/83	28.6	70.8	20.2	[3]
CaO-CeO <sub>2</sub>	750	200	1	C <sub>2</sub> H <sub>6</sub> /CO <sub>2</sub> /N <sub>2</sub> =5/10/85	24.2	91	22	[4]
<b>Cr-catalysts</b>								
Cr(5)/SBA-15	700	12	0.2	C <sub>2</sub> H <sub>6</sub> /CO <sub>2</sub> =1/3	46.3	94.7	43.8	[5]
Cr(5)-Ce(10)/SBA-15	700	12	0.2	C <sub>2</sub> H <sub>6</sub> /CO <sub>2</sub> =1/3	55	96	52.8	[5]
Cr(5)/CLT-IA	700	60	0.5	C <sub>2</sub> H <sub>6</sub> /CO <sub>2</sub> /N <sub>2</sub> =1/5/4	39.74	98.8	39.3	[6]

