Supporting Information for:

Synergistic Effect of Acidic Sites and Mesoporous Confinement in Ce-Doped Ru/SBA-15 Catalysts for Efficient Hydrogenolysis of Low-Density Polyethylene to Liquid Fuels

Zhenghang Ren[a], Zhicheng Luo[a,*], Huiyan Zhang[a,*]

[a] *Key Laboratory of Energy Thermal Conversion and Control of Ministry of Education, School of Energy and Environment, Southeast University, Nanjing 211189, China*

**Corresponding author.*

E-mail addresses: zluo@seu.edu.cn(Zhicheng Luo), hyzhang@seu.edu.cn(Huiyan Zhang).

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Table S1 Correction Factor Coefficients for Alkanes with Different Carbon Numbers Relative to Octacosane.

Carbon Number	Correction Factor	Carbon Number	Correction Factor
C_7	2.808	C_{23}	1.034
C_8	2.014	C_{24}	1.039
C_9	1.623	C_{25}	1.035
C_{10}	1.393	C_{26}	0.995
C_{11}	1.307	C_{27}	1.012
C_{12}	1.256	C_{28}	1.000
C_{13}	1.236	C_{29}	1.027
C_{14}	1.188	C_{30}	0.989
C_{15}	1.179	C_{31}	0.954
C_{16}	1.149	C_{32}	0.919
C_{17}	1.130	C_{33}	0.939
C_{18}	1.101	C_{34}	0.942
C_{19}	1.125	C_{35}	1.043
C_{20}	1.060	C_{36}	1.194
C_{21}	1.081	C_{37}	1.486
C_{22}	1.037	C_{38}	1.87

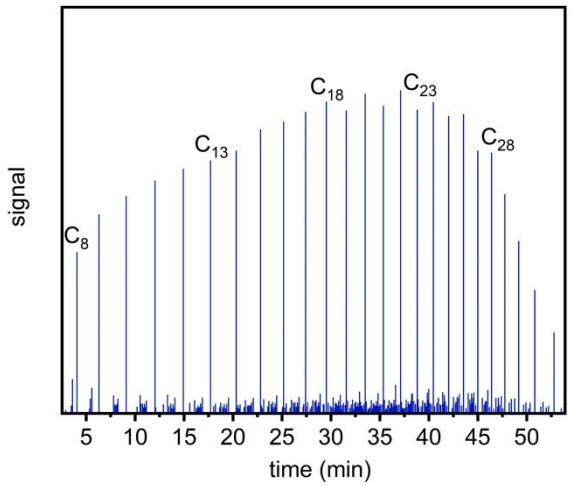

Figure S1 Typical GC-MS signals of LDPE hydrogenolysis liquid products dissolved in methylene chloride over the Ru-Ce/SBA-15 catalyst.

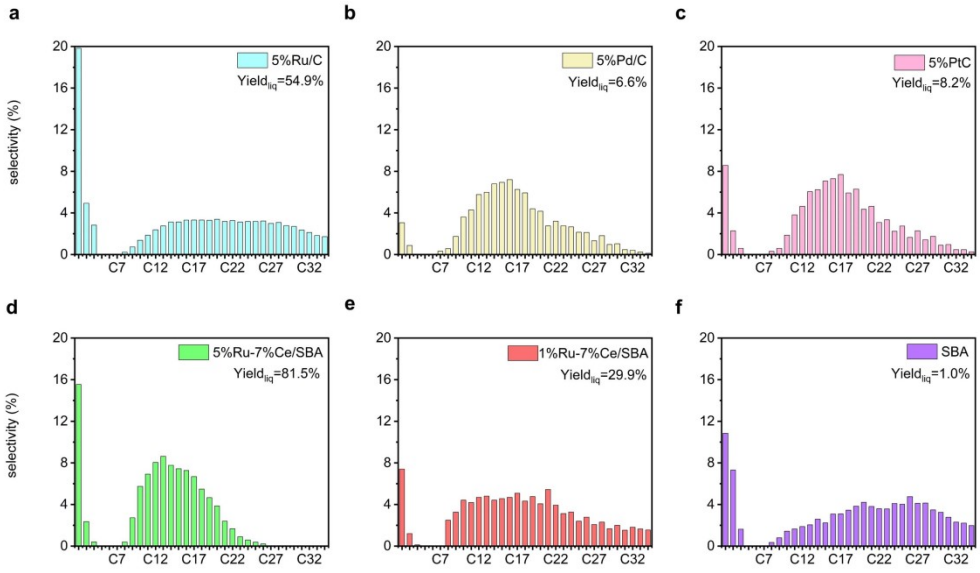

Figure S2 Carbon distributions of the products for LDPE hydrogenolysis over different catalysts.

Table S2 Comparison of Reaction Conditions and Performance of Ru-based catalysts in LDPE hydrogenolysis.

catalyst	temperature (K)	pressure (MPa)	time(h)	plastic/ catalyst	reaction rate ($g_p \cdot g_{Ru}^{-1} \cdot h^{-1}$)	liquid yield (%)	ref.
Ru/C	473	2	16	28	15.75	45.00	[1]
Ru/C	493	3	1	2	29.96	74.90	[2]
Ru/C	498	2	16	14	11.90	68.00	[3]
Ru/C	448	8.2	76	10	1.50	57.00	[4]
Ru/CeO_2	513	6	5	34	4.30	91.00	[5]
Ru/CeO_2	453	3	18	4	3.44	31.00	[6]
Ru/SAC CeO_2	523	2	6	4	315.00	94.50	[7]
Ru-WZr	523	5	2	40	220.00	55.00	[8]
Ru/ZrO_2	513	6	4	34	151.13	88.90	[9]
Ru/ZrO_2	473	5	5	6	14.84	87.30	[9]
Ru/VZr	523	5	2	80	544.00	68.00	[10]
Ru/TiO_2-R	523	3	6	34	94.52	83.40	[11]
Ru-Ce/SBA-15	553	3	24	100	509.14	43.99	this work
Ru-Ce/SBA-15	553	3	6	100	800.46	17.29	this work

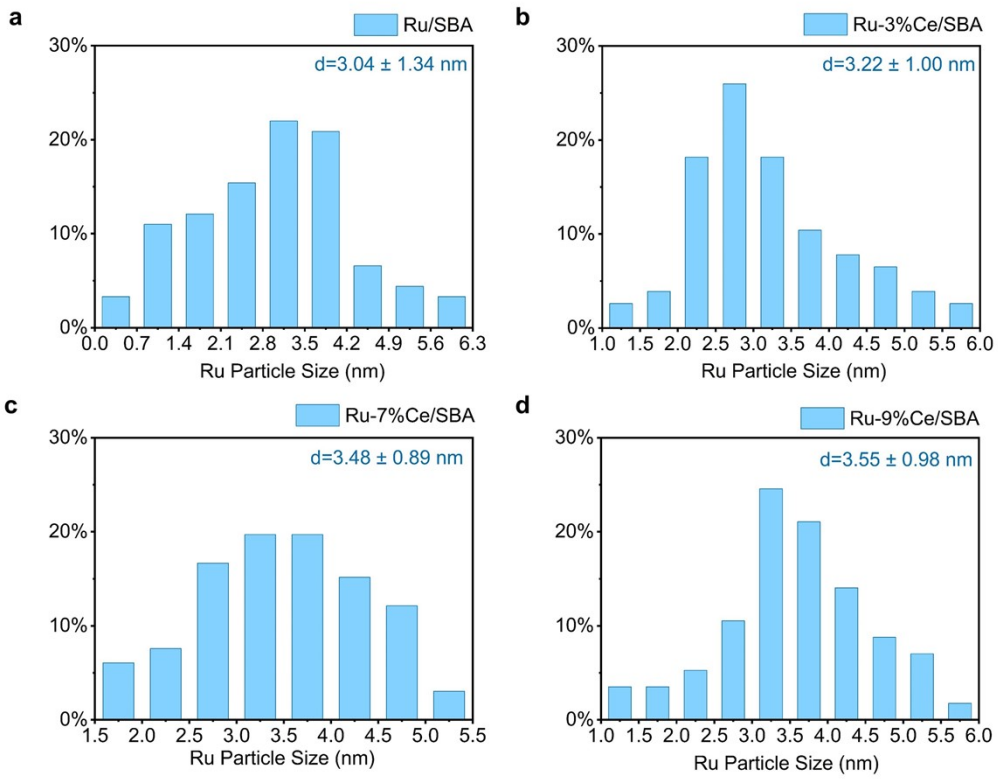

Figure S3 Ru nanoparticle size distribution on Ru-Ce/SBA-15 with different Ce loadings.

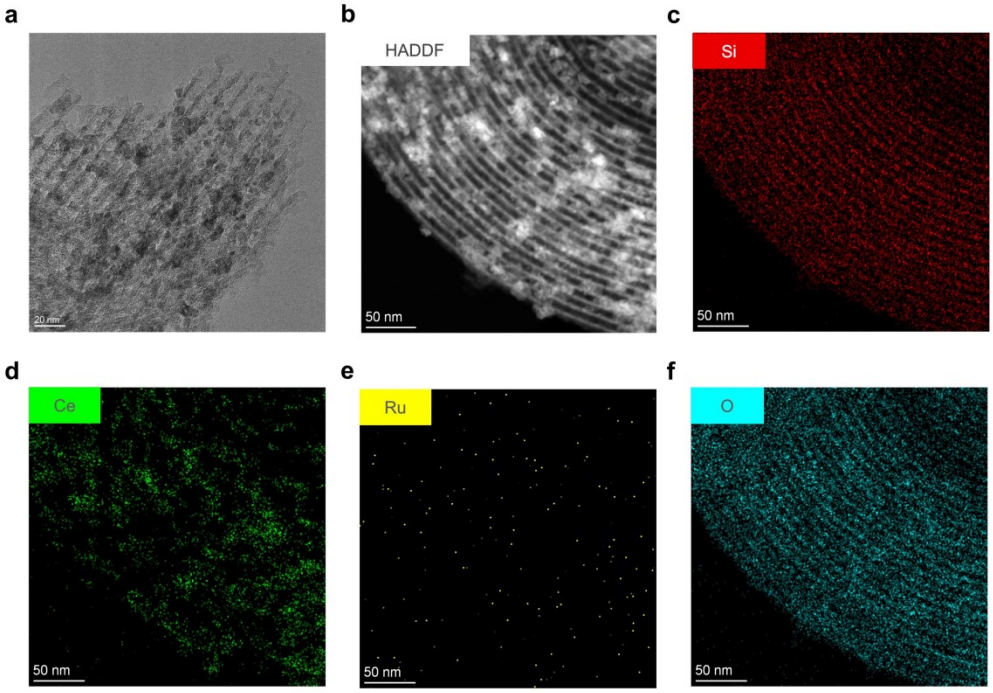

Figure S4 Characterizations of 1%Ru-3%Ce/SBA-15. (a) TEM image. (b) HAADF images. (c-f) elemental mapping images.

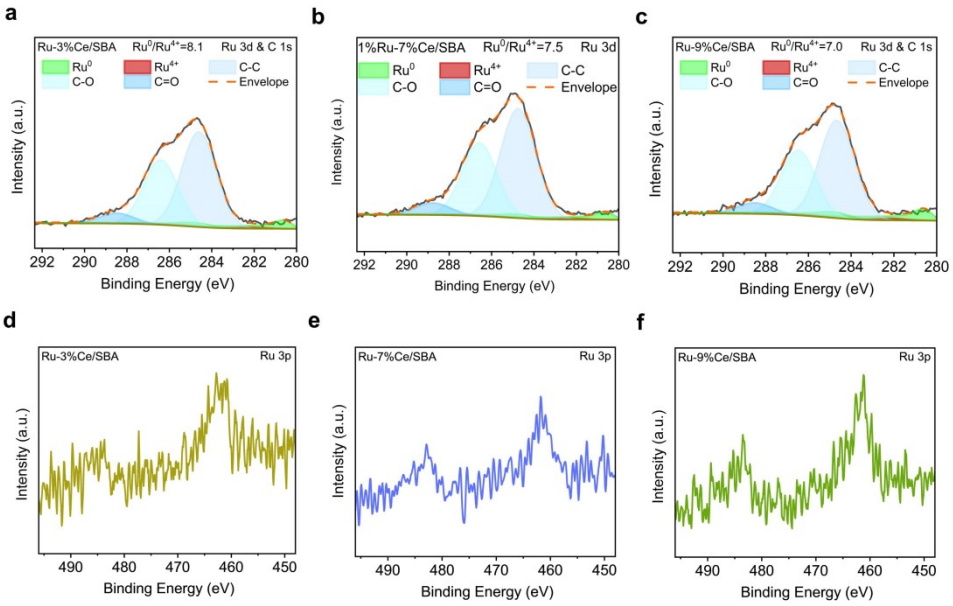

Figure S5 XPS spectra of (a-c) Ru3d and (d-f) Ru3p for Ru-Ce/SBA-15 with different Ce loadings.

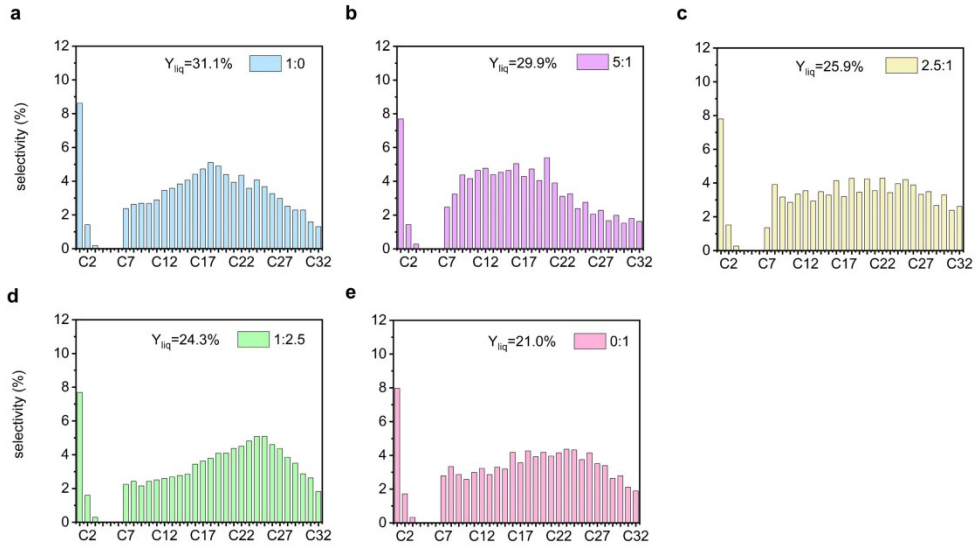

Figure S6 Carbon distributions of LDPE hydrogenolysis over 1%Ru-5%Ce/SBA-15 prepared with different ethanol to water ratios.

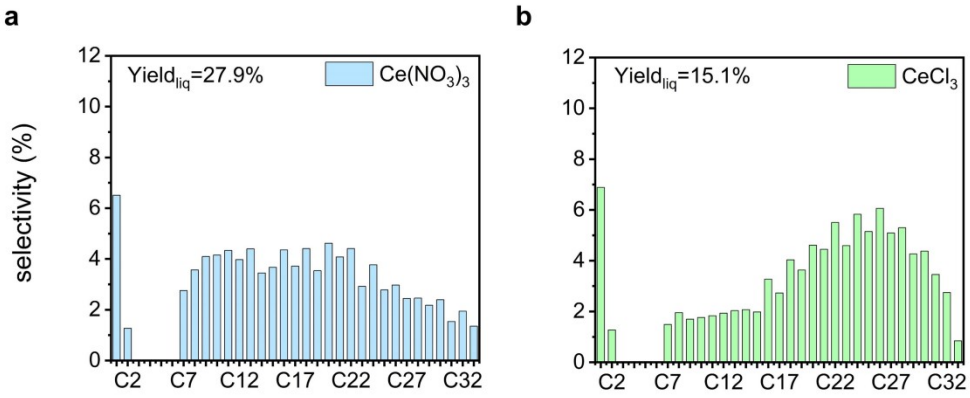

Figure S7 Carbon distributions of LDPE hydrogenolysis over 1%Ru-5%Ce/SBA-15 prepared with different Ce precursors.

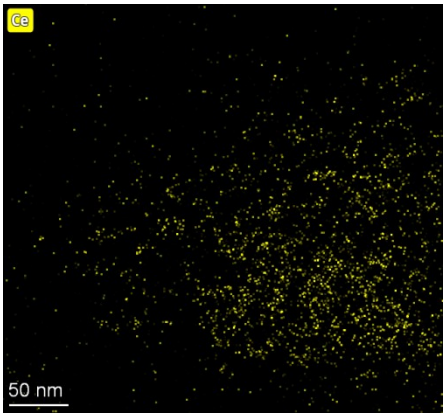

Figure S8 Elemental mapping images of 1%Ru-7%Ce/SBA-15 synthesized using $CeCl_3$.

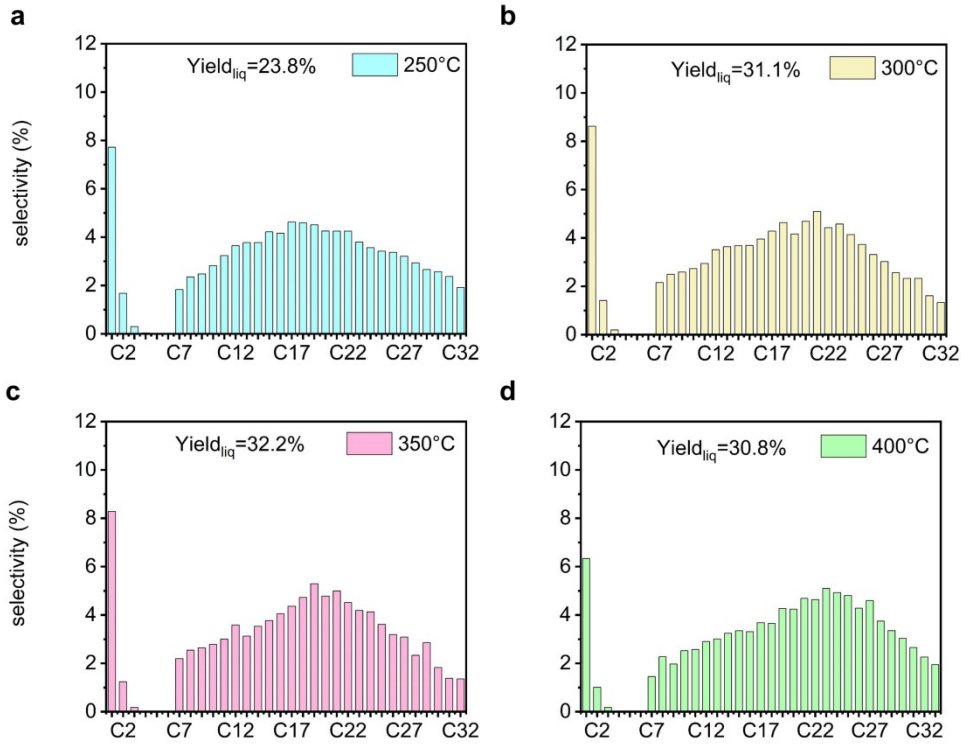

Figure S9 Carbon distributions of LDPE hydrogenolysis over 1%Ru-5%Ce/SBA-15 calcined at different temperatures.

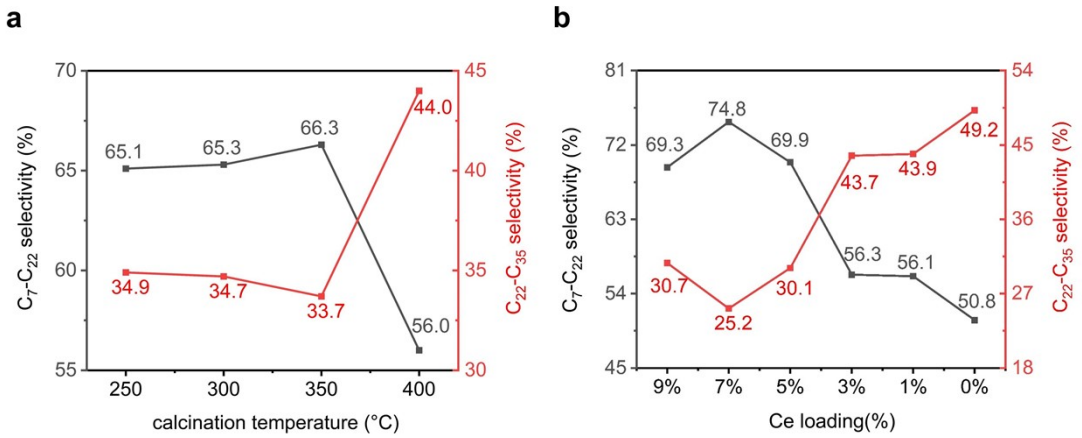

Figure S10 Selectivity of liquid products for LDPE hydrogenolysis over 1%Ru-Ce/SBA-15 (a) calcined at different temperatures and (c) with different Ce Loadings.

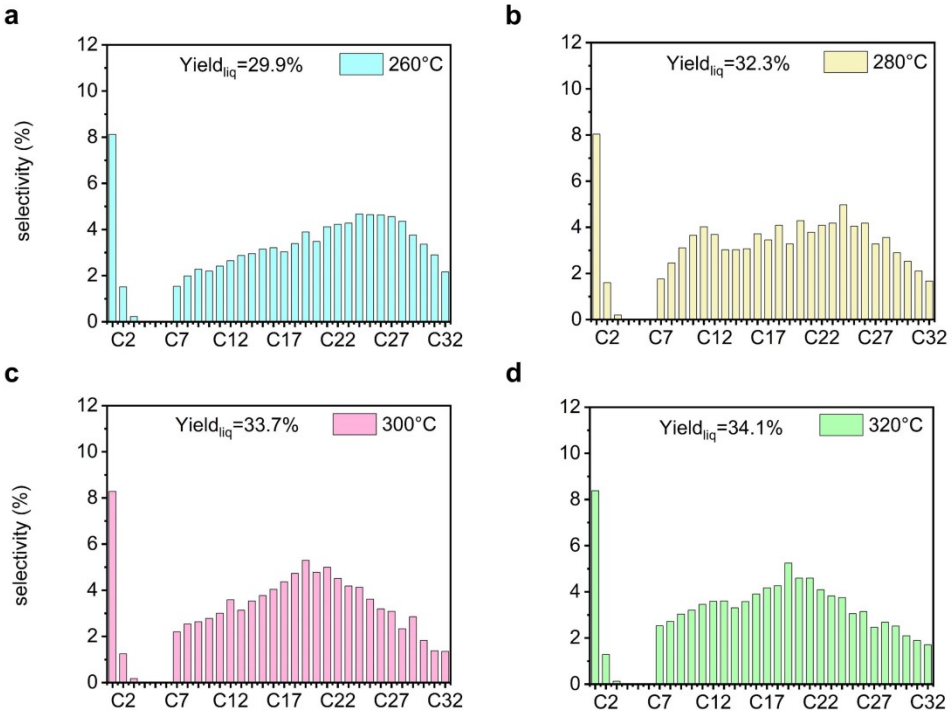

Figure S11 Carbon distributions of LDPE hydrogenolysis over 1%Ru-7%Ce/SBA-15 at different reaction temperatures.

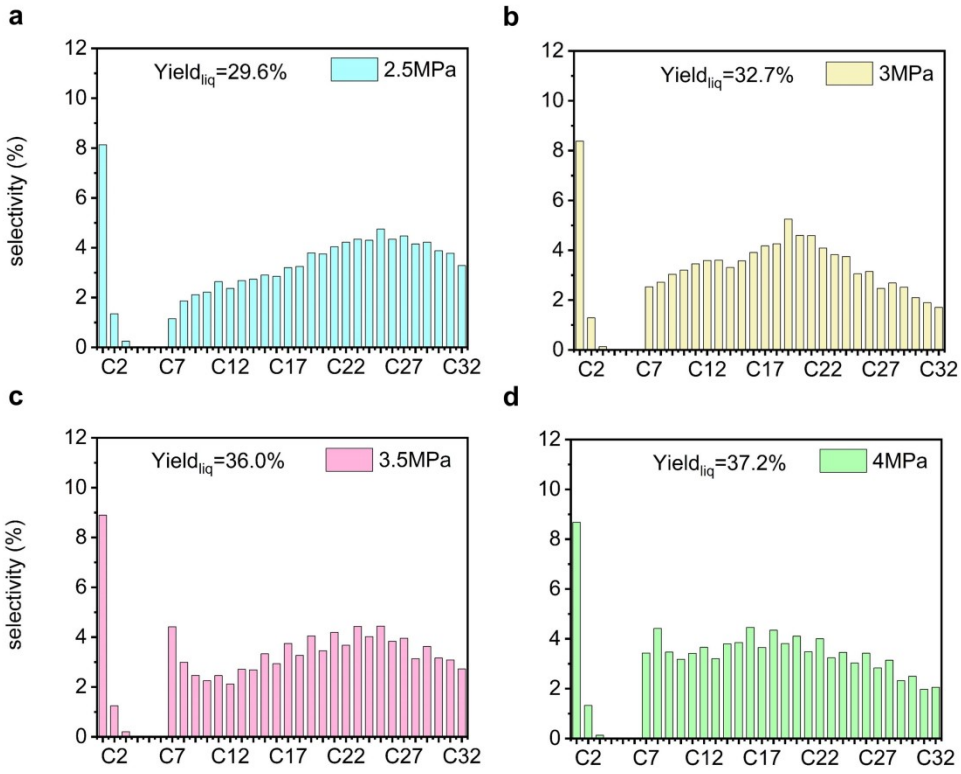

Figure S12 Carbon distributions of LDPE hydrogenolysis over 1%Ru-7%Ce/SBA-15 under different H_2 pressures.

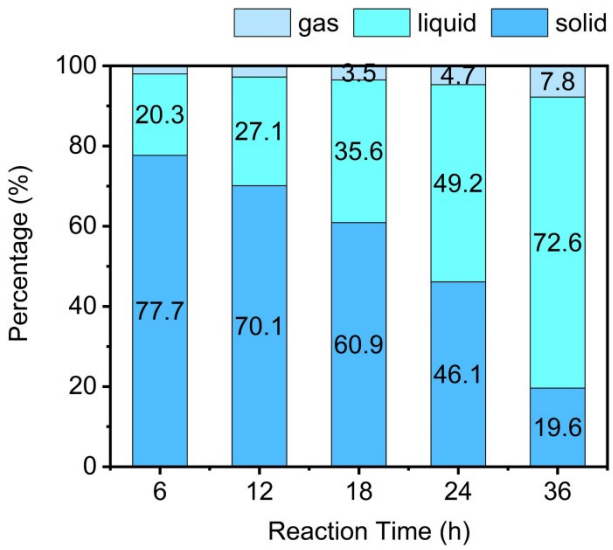

Figure S13 Yields of triphasic products for LDPE hydrogenolysis over 1% Ru-7% Ce/SBA-15 for different reaction times.

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