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Supporting Information

Chemical grafting of Co_9S_8 onto C_{60} for hydrogen spillover and storage

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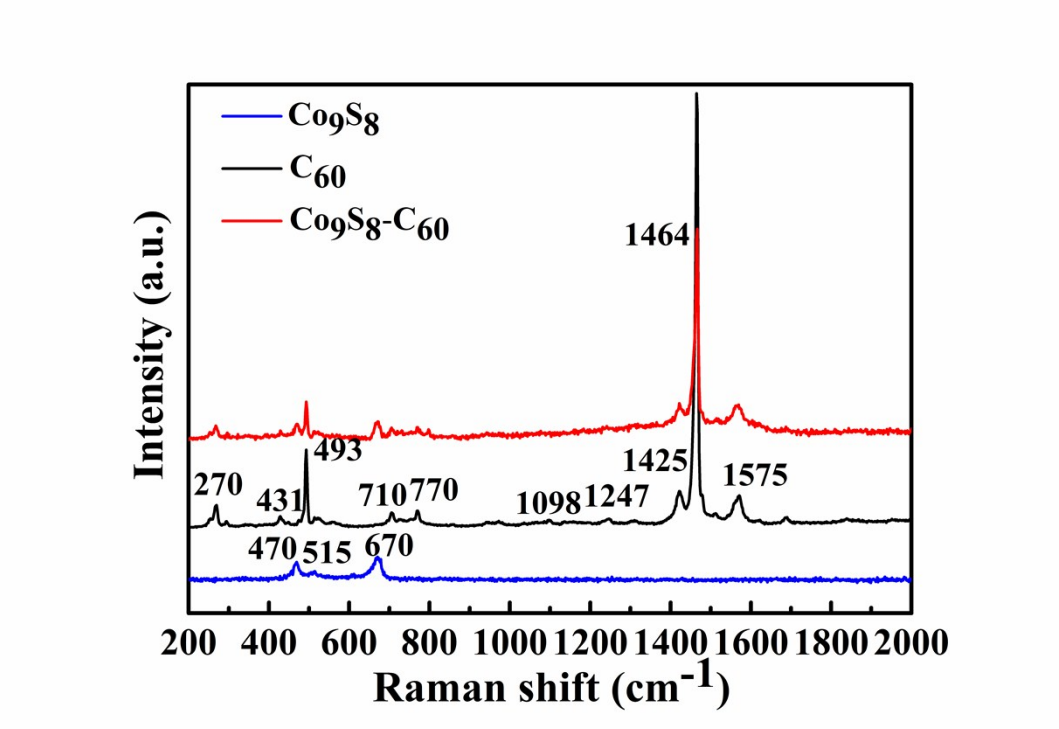

Figure S1. Raman spectra of raw C_{60}, Co_9S_8 and the Co_9S_8-C_{60} hybrid.

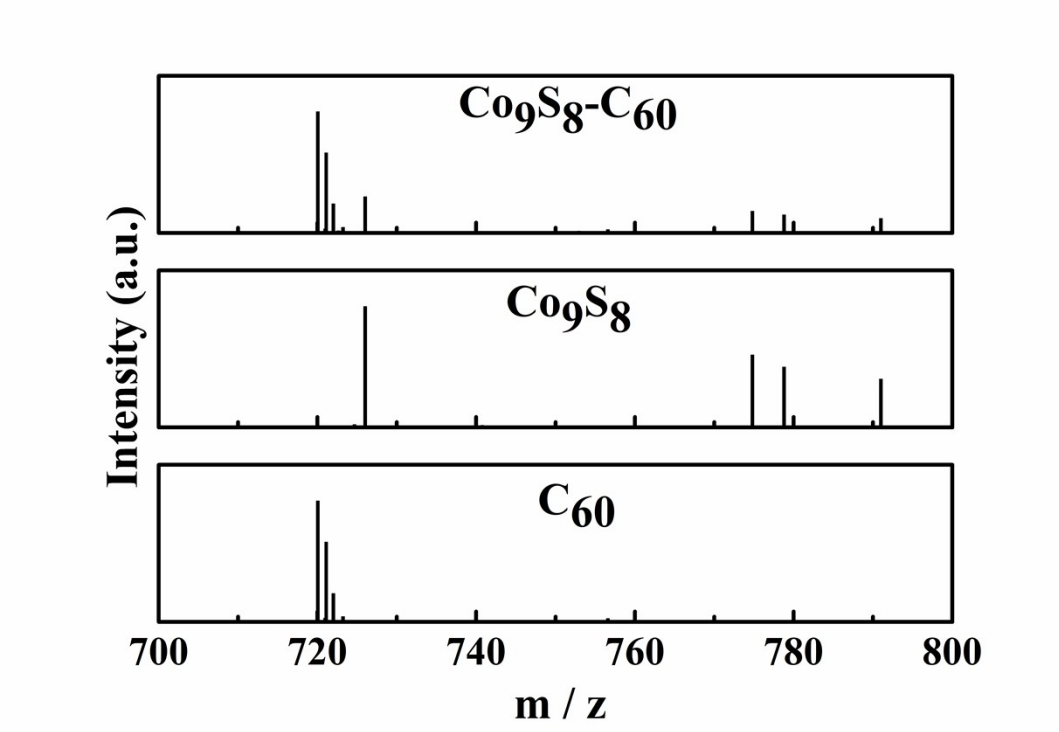

Figure S2. LDI-MS spectra of raw C_{60}, Co_9S_8 and the Co_9S_8-C_{60} hybrid.

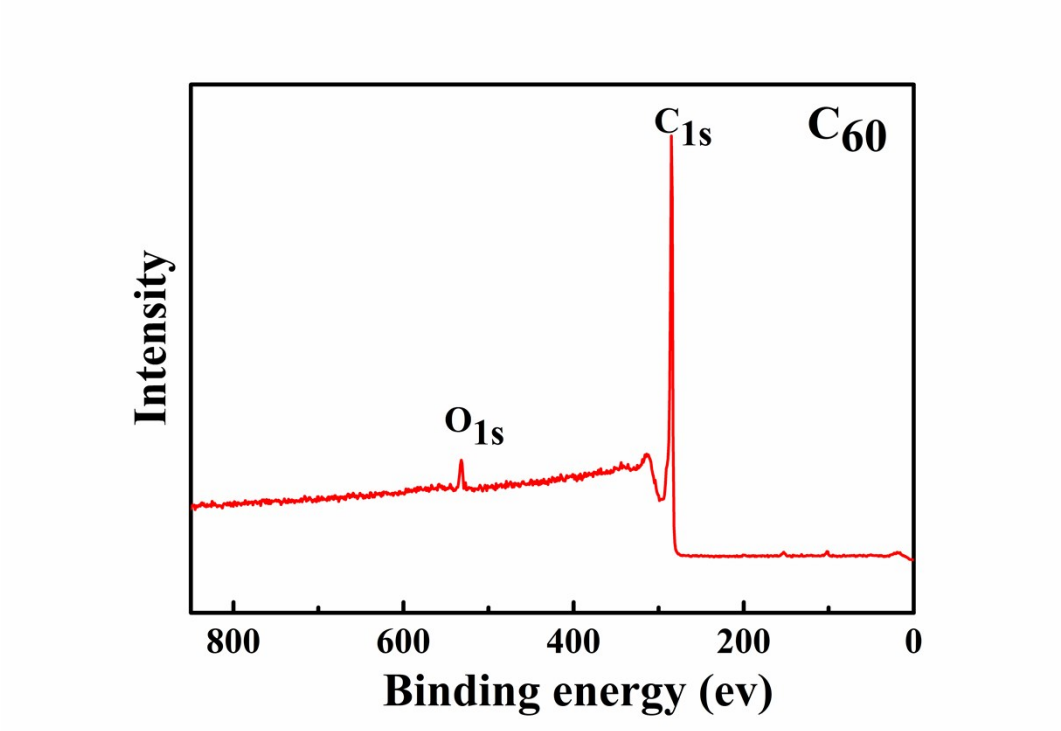

Figure S3. XPS spectra of the C_{60}.

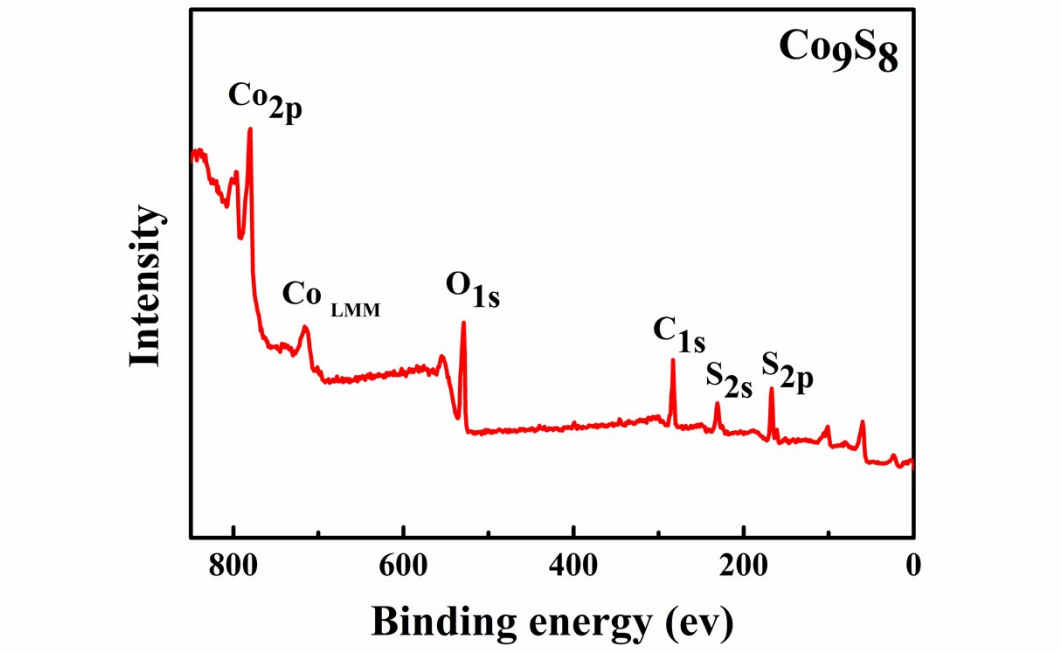

Figure S4. XPS spectra of the Co_9S_8.

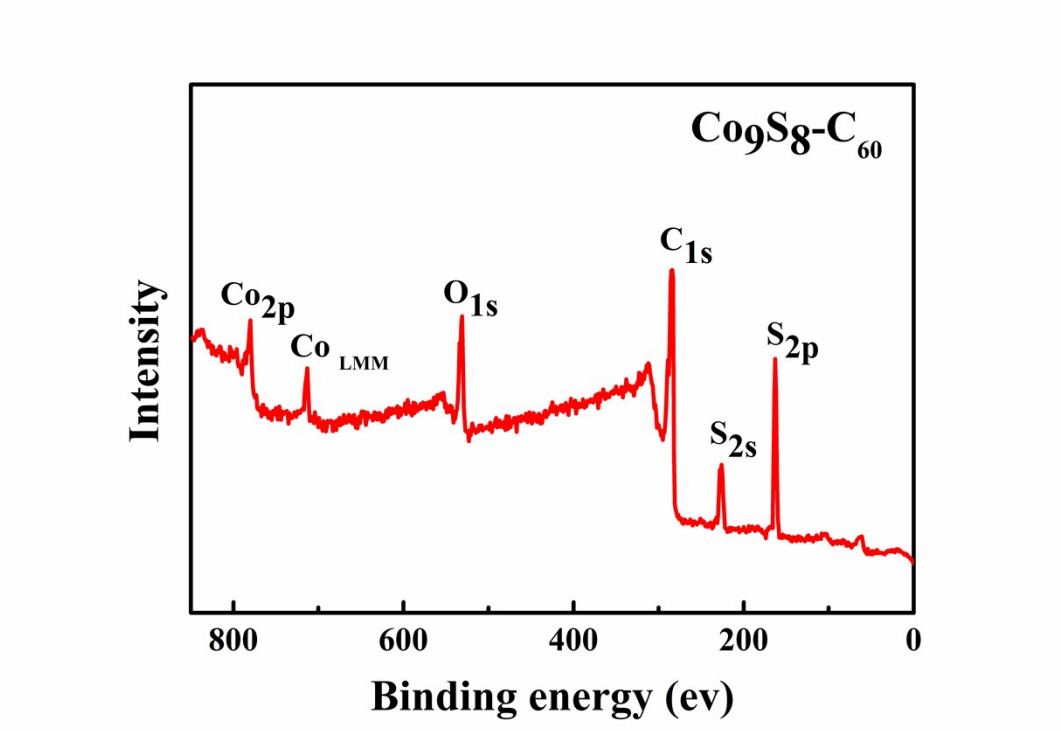

Figure S5. XPS spectra of the pizza-like Co_9S_8-C_{60} hybrid.

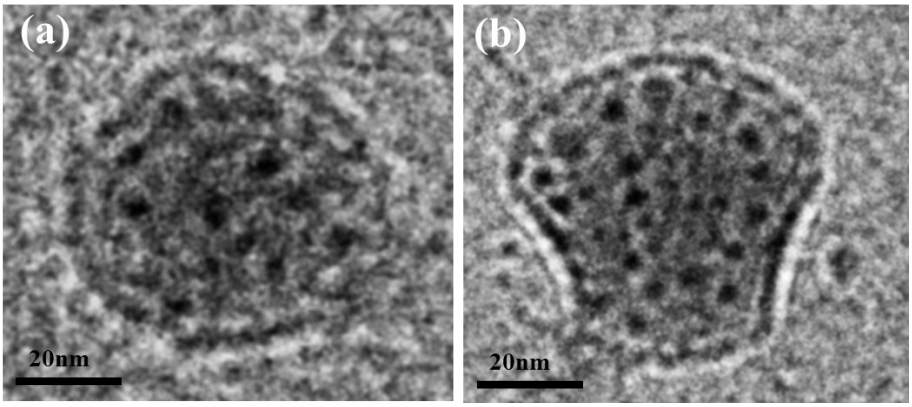

Figure S6. (a) (b) TEM images of the pizza-like Co_9S_8-C_{60} hybrid.

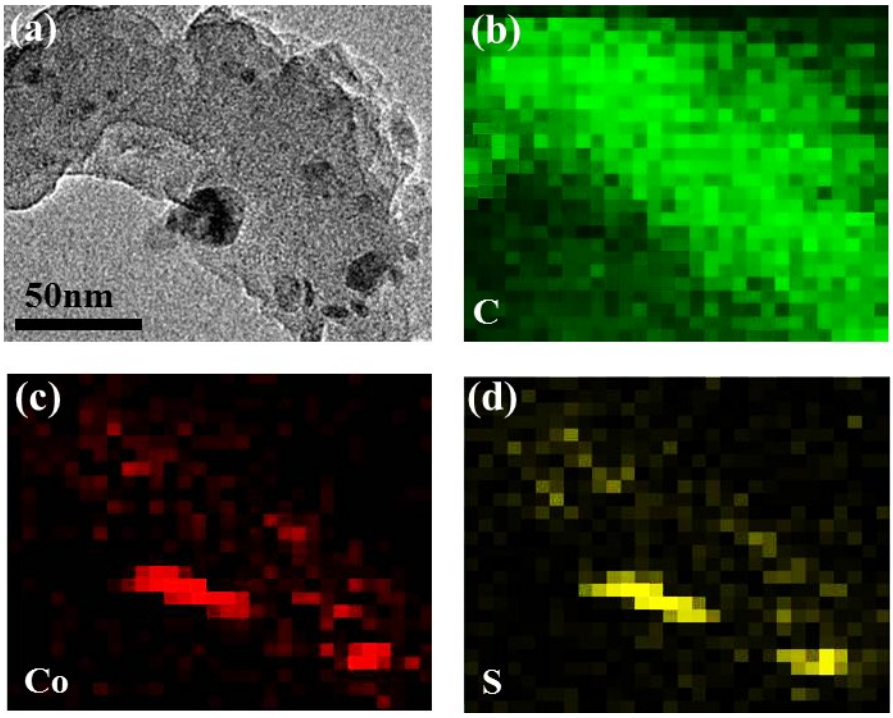

Figure S7. (a) TEM image of the Co_9S_8-C_{60} hybrid; (b-d) EDS elemental mapping images of C, Co and S in the Co_9S_8-C_{60} hybrid.

Table S1. Elemental content of the Co_9S_8-C_{60} hybrid.

Sample	**Element Percent (wt %)**		
	C	S	Co
Co_9S_8-C_{60}	73.48	9.13	17.39

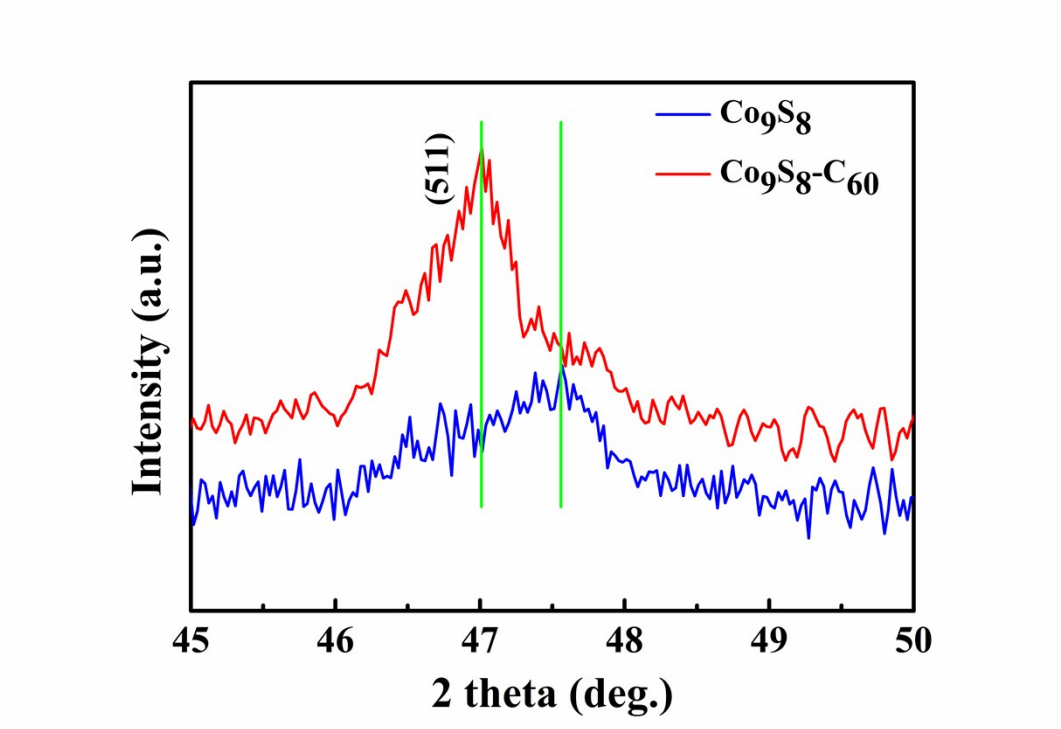

Figure S6. XRD patterns of the Co_9S_8 and the pizza-like Co_9S_8-C_{60} hybrid.

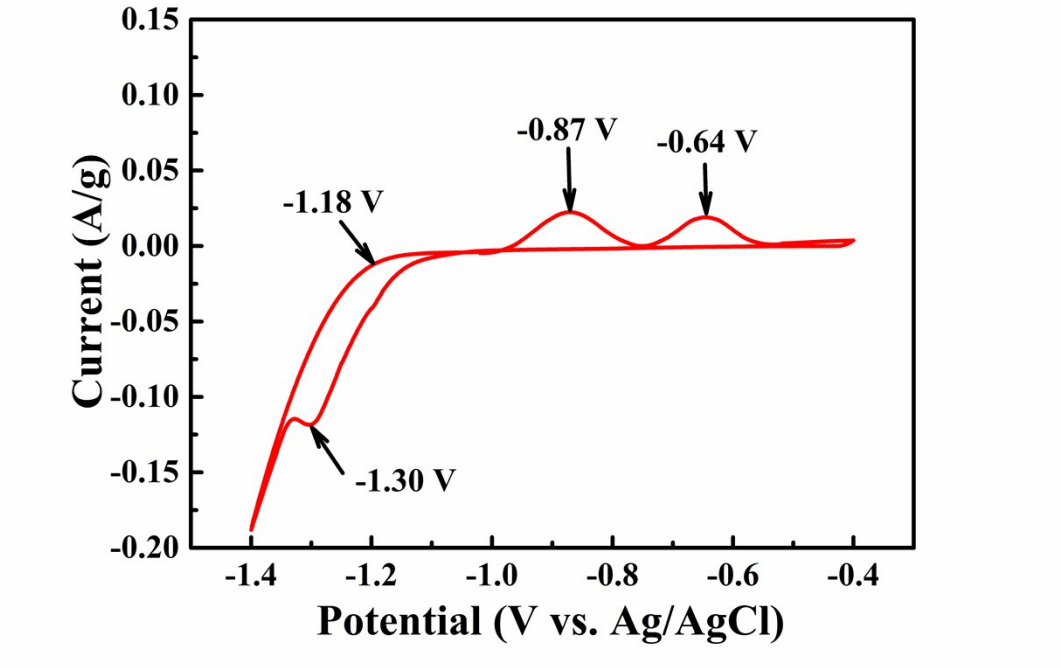

Figure S7. Cyclic voltammogram curves of the pizza-like Co_9S_8-C_{60} hybrid.

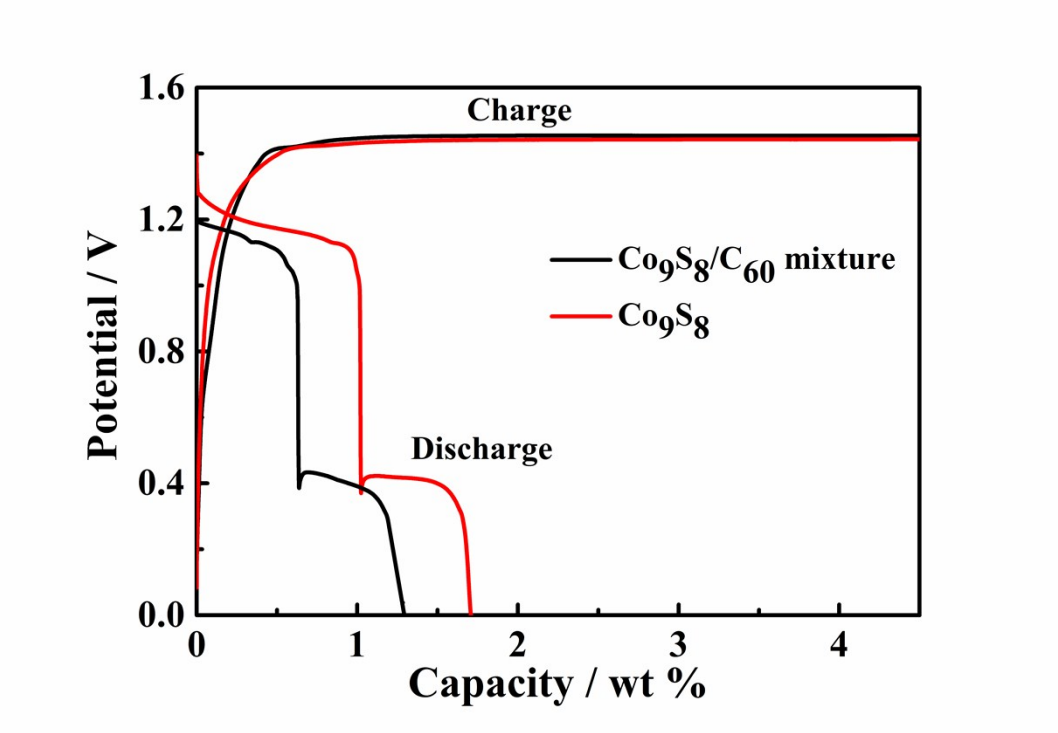

Figure S8. Charge-discharge curves of the Co_9S_8 and the Co_9S_8/C_{60} mixture.

Table S1. Hydrogen storage capacity retention ratios of raw C_{60}, Co_9S_8 and Co_9S_8/C_{60} mixture and the pizza-like Co_9S_8-C_{60} hybrid.

Sample	Hydrogen storage capacity (wt%)	Capacity Ratio(%)		
		Ⅰ voltage plateaus	Ⅱ voltage plateaus	Ⅲ voltage plateaus
C_{60}	0.52	-----	-----	100
Co_9S_8	1.72	59	-----	41
Co_9S_8/C_{60} mixture (m_{Co1-xS}:m_{rGO}=1:3)	1.29	54	-----	46
Co_9S_8-C_{60} (m_{Co1-xS}:m_{rGO}=1:3)	4.03	21	43	36

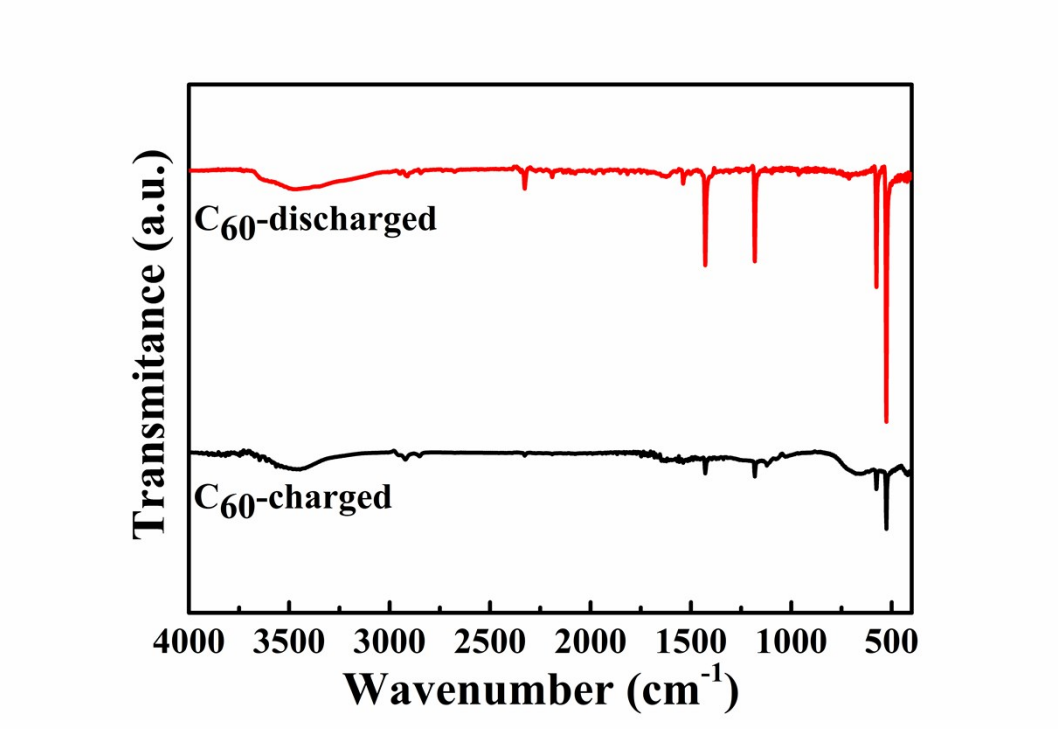

Figure S9. FT-IR spectrum of charged and discharged C_{60} ball milling at the speed of 500 rpm for 6h under Ar gas atmosphere.

Table S2. HRD values of the pizza-like Co_9S_8-C_{60} hybrid

Sample $m_{Co9S8}:m_{RGO}$	**High-rate-dischargeability (%)**				
	HRD_{200}	**HRD_{400}**	**HRD_{600}**	**HRD_{800}**	**HRD_{1000}**
1:3	87	82	78	77	76

Table S3. Capacity retention ratio of the raw C_{60}, Co_9S_8 and Co_9S_8-C_{60} hybrid.

Sample $m_{Co9S8}:m_{RGO}$	Hydrogen storage capacity（wt%）	Capacity after 50 cycles（wt%）	Capacity retention ratio（%）
C_{60}	0.52	0.10	19.23
Co_9S_8	1.72	1.17	68.02
1:3	4.03	3.24	80.39