Supplementary Information

Valorization of Rice Husk Waste for CO_2 Capture and Utilization

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Figure S1. Optical comparison of the synthesized samples: (a) Si; (b) Si-Fe 5%; (c) Si-Fe 10%; (d) Si-Co 5%; (e) Si-Co 10%.

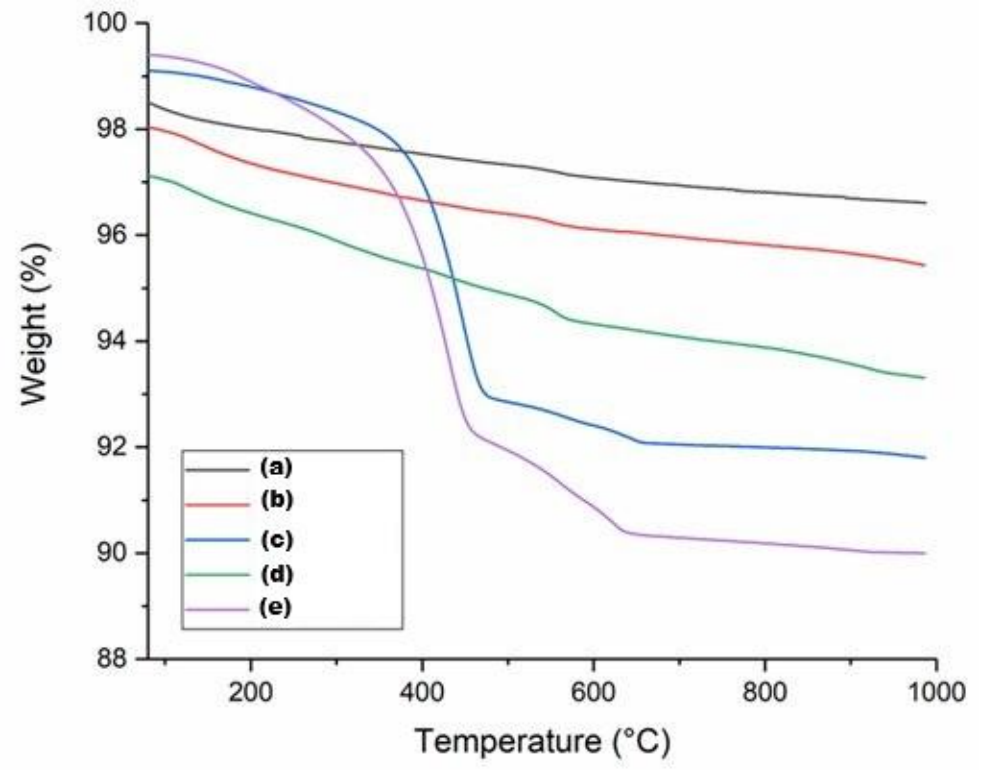

Figura S2. Isotherms of the samples: (a) Si; (b) Si-Fe 5%; (c) Si-Fe 10%; (d) Si-Co 5%; (e) Si-Co 10%.

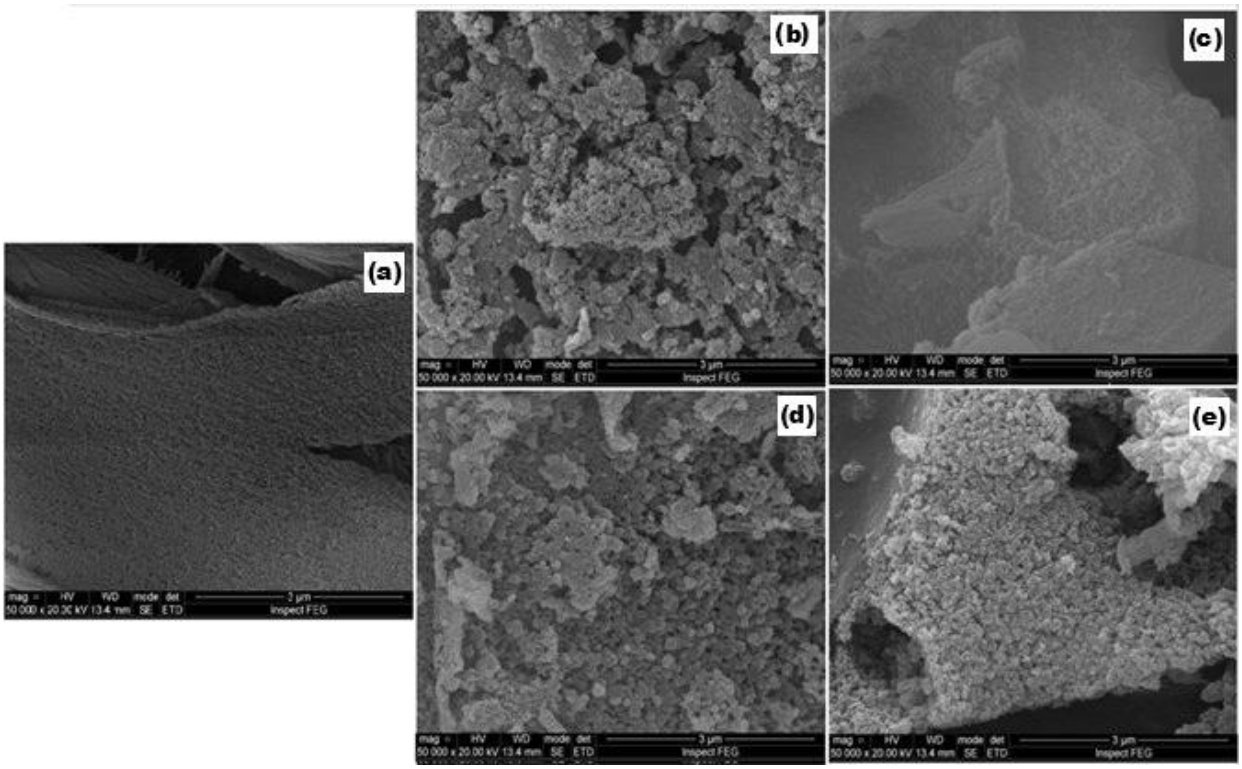

Figure S3. SEM images (magnification: 50.000×) of the samples: (a) Si; (b) Si-Fe 5%; (c) Si-Fe 10%; (d) Si-Co 5%; (e) Si-Co 10%.

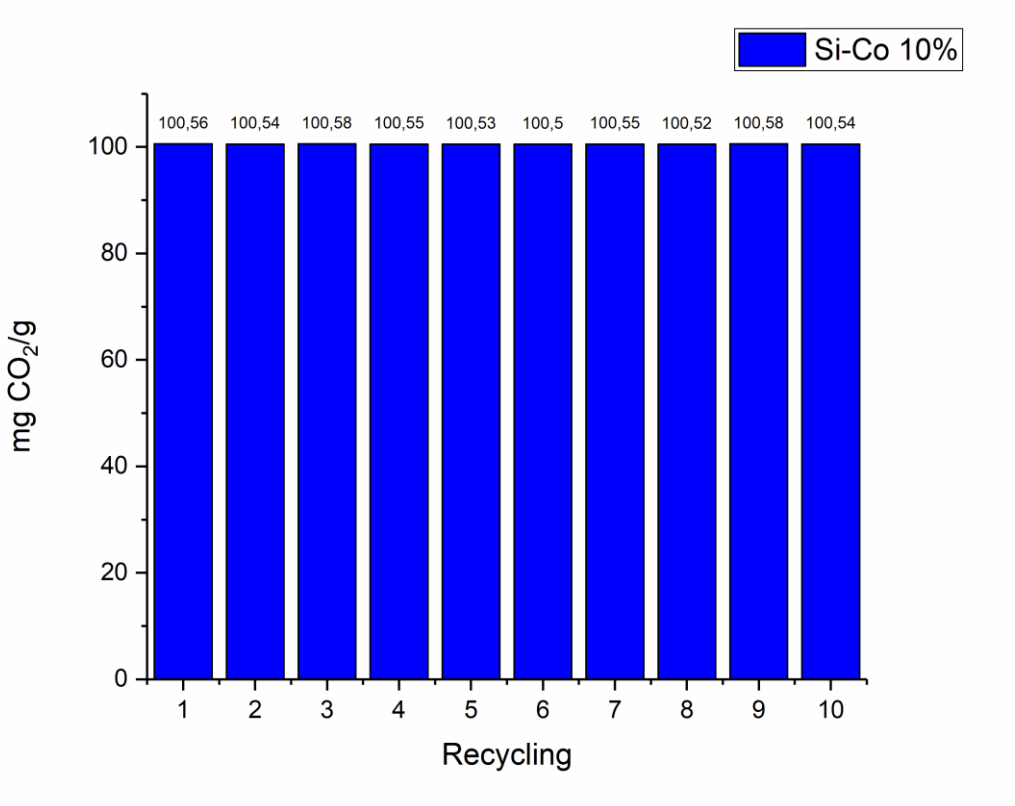

Figure S4. Sorption recycling test of the sample Si-Co 10%.

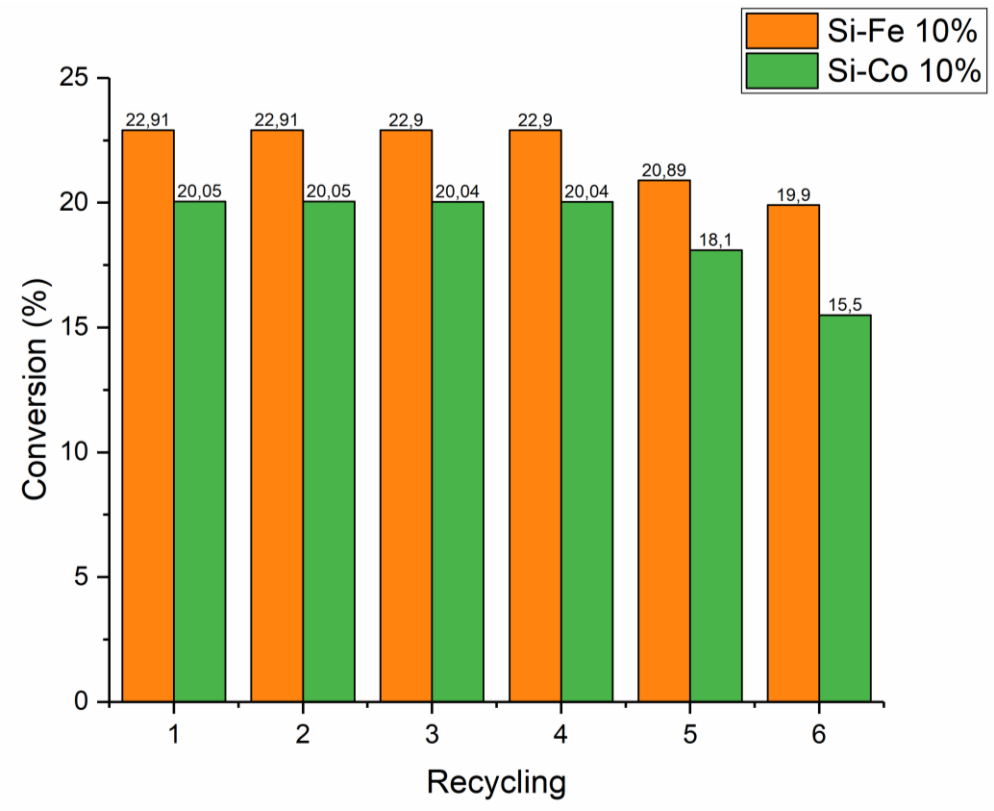

Figure S5. Conversion recycling test of samples Si-Fe 10% and Si-Co 10%.

Table S1. Conversion and selectivity of reactions using the synthetized catalysts

entry	Catalyst	Temperature / °C	Molecular sieve / g	time / h	Pressure / bar	Selectivity / %	Conversion[c] / %	Reference
1	Si	80	2.00	24	40	> 99	6.54	this work
2	Si-Fe 5%	80	2.00	24	40	> 99	14.73	this work
3	Si-Fe 10%	80	2.00	24	40	> 99	22.91	this work
4	Si-Co 5%	80	2.00	24	40	> 99	12.49	this work
5	Si-Co 10%	80	2.00	24	40	> 99	20.05	this work
6	Si-Fe 10%	80	–	24	40	> 99	19,60	this work
7	Si-Co 10%	80	–	24	40	> 99	17.20	this work
8[a]	Si-Fe 10%	80	2.00	24	40	> 99	12.75	this work
9[a]	Si-Co 10%	80	2.00	24	40	>99	10.93	this work
10[b]	Si-Fe 10%	80	–	24	40	> 99	11.25	this work
11[b]	Si-Co 10%	80	–	24	40	> 99	9.58	this work
–	ES-Fe	80	2.00	24	40	> 99	12.7	Faria *et al*.[1]
–	$Zn_xCe_{1-x}O_2$	160	–	48	24	85.1	20.5	Faria *et al*.[1]

The reactions were carried out using 213 mmol of methanol, 20 mmol of CH_3I, 2.0 g of molecular sieve, pressure 40 bar, temperature of 80 °C for 24 h. [a]Without iodide; [b]without sieve and CH_3I; [c]standard deviation values less than 0.007.

Reference

1. Faria, D. J.; dos Santos, L. M.; Bernard, F. L.; Pinto, I. S.; Chaban, V. V.; Romero, I. P.; Einloft, S.; *J. Mol. Struct.* **2023**, *1292*, 136110. [Crossref]