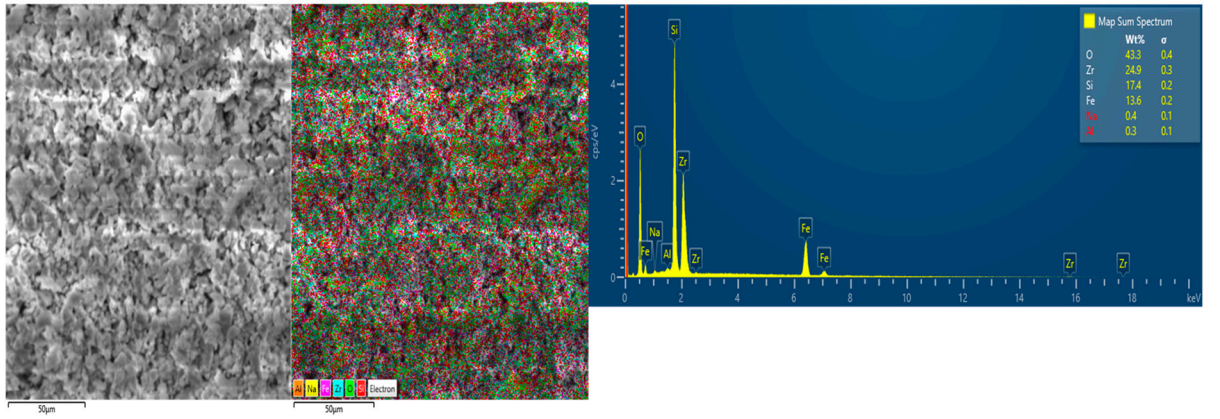
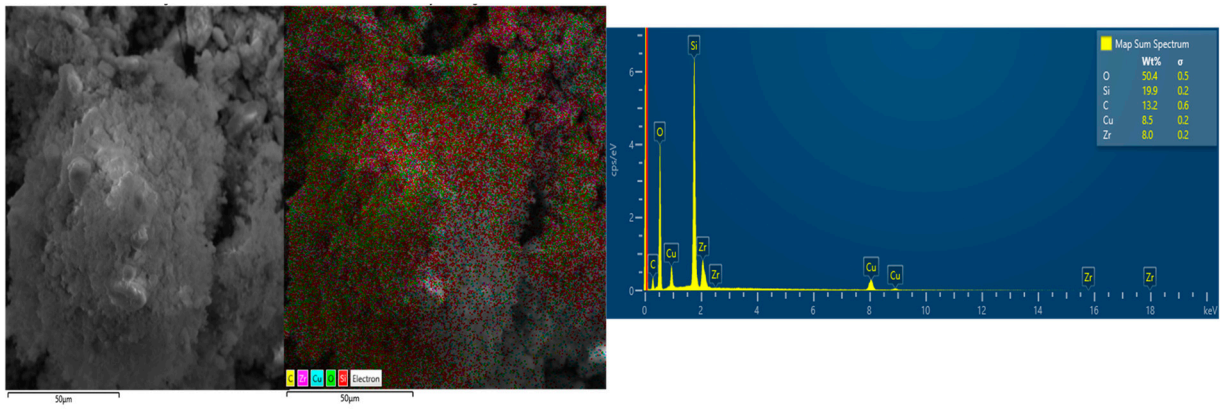


Figure S1. SEM and EDS mapping and spectra of selected calcined samples: Fe/NZ-SZT and Cu/NZ-SZT.

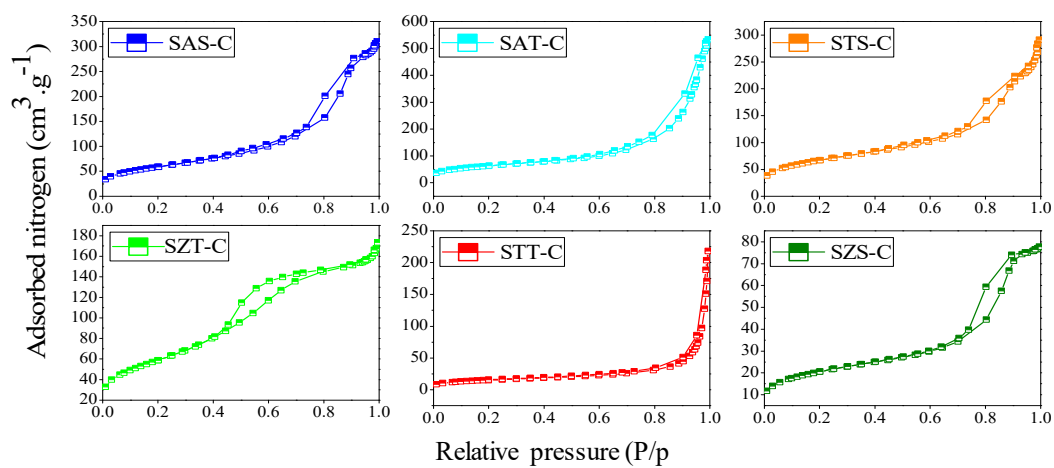


(a)

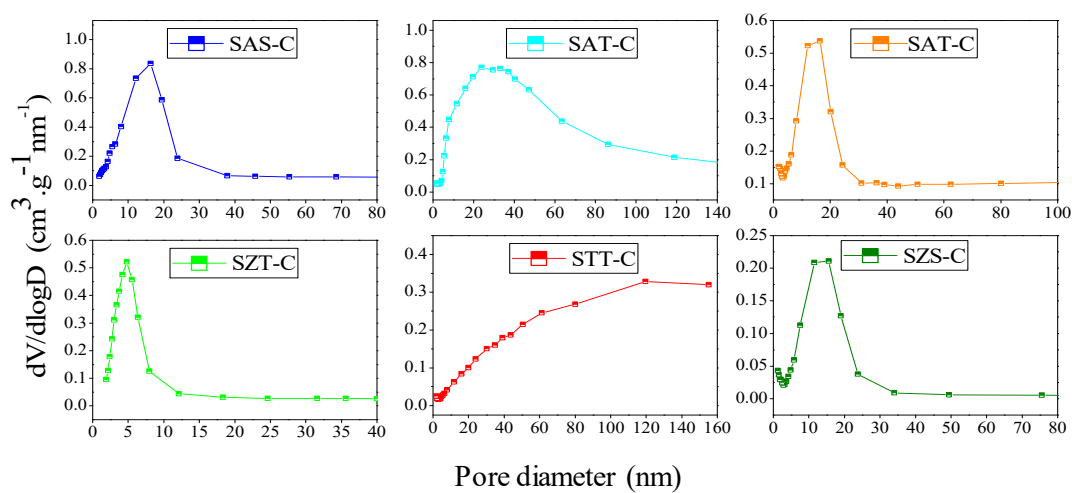


(b)

Figure S2. (a) Nitrogen physisorption isotherms and (b) pore size distributions of the calcined silica-based mesostructured spheres.



(a)



(b)

Table S1. Description of the silica-based mesostructured samples.

Silica source	Metal cation added to the solid	Nomenclature of the as-synthesized solids	Nomenclature of the calcined solids
Colloidal silica	Al	SAS	SAS-C
TEOS	Al	SAT	SAT-C
Colloidal silica	Ti	STS	STS-C
TEOS	Ti	STT	STT-C
Colloidal silica	Zr	SZS	SZS-C
TEOS	Zr	SZT	SZT-C

Table S2. Description of the NZ-SMT (M=Al, Ti or Zr) series of solids.

Seed used	Nomenclature
SAT	NZ-SAT
STT	NZ-STT
SZT	NZ-SZT

Table S3. Surface composition in wt.% taken by XPS analyses.

Sample	Si	Al	O	C	Na	Ti	Zr
SAS-C	32.3	8.9	50.3	7.0	1.5		
SAT-C	25.0	8.8	57.6	8.0	0.59		
STS-C	27.0		52.1	4.6		16.3	
STT-C	32.4		54.0	4.2		9.4	
SZT-C	34.7		54.3	2.8			8.1
NZ-SAT	27.5		54.1	13.2	0.26	4.9	

Table S4. Comparison of the catalytic properties of the Cu and Fe-based catalysts in the esterification of glycerol with acetic acid reaction.

Sample	Glycerol conversion (%)	Reaction conditions	References
Cu/Al ₂ O ₃	Conversion=84%; Selectivity to triacetin= 2.3%	Glycerol/acetic acid (molar ratio) = 0.25. Catalyst= 0.25 g; time = 5 h; reaction temperature=110 °C	[68]
CuCa-based hydrotalcite	Conversion=39.6%;Selectivity to triacetin =20.2%	Glycerol/acetic acid (molar ratio) = 1:9. Catalyst= 75 mg; time = 6 h; reaction temperature=80 °C	[22]
Fe-containing mesoporous alumina	Triacetin selectivity = 97.8%	Catalyst= 10 wt.% t = 41 min Ultrasonic conditions; Molar ratio of crude glycerol to acetic acid = 1-7; T=80°C	[69]