Supplementary Material

Curcumin loaded mesoporous silica: An effective drug delivery system for cancer treatment

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1. Nitrogen adsorption-desorption isotherms:

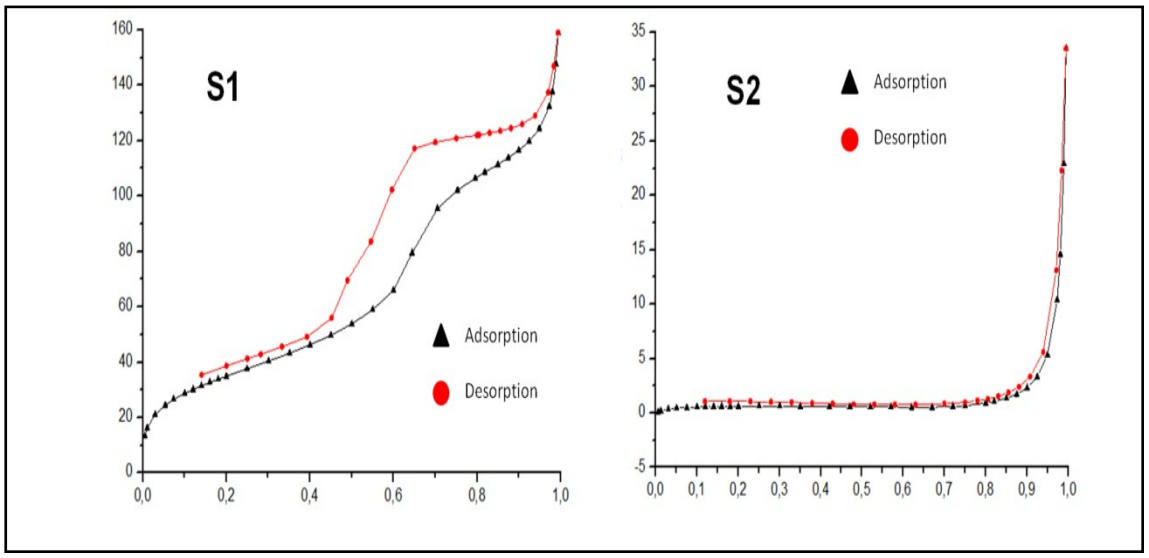

Figure S1. Nitrogen adsorption-desorption isotherms of materials **S1**, and **S2** (*x axis* = Adsorbed volume (cm^3/g); *y axis* = Relative presure P/P_0).

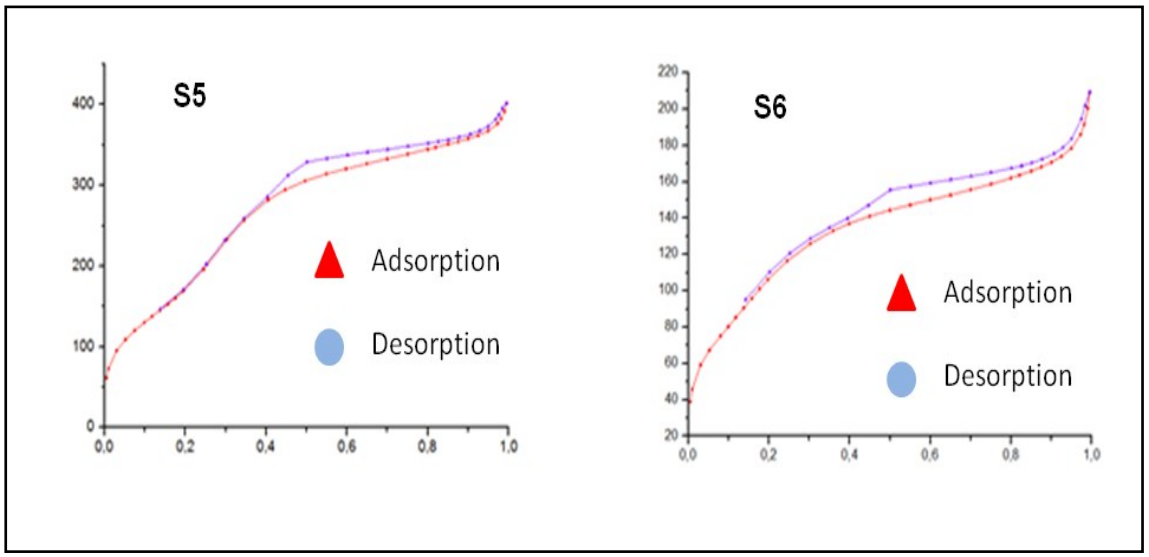

Figure S2. Nitrogen adsorption-desorption isotherms of materials **S5**, and **S6** (*x axis* = Adsorbed volume (cm^3/g); *y axis* = Relative presure P/P_0).

2. X-ray diffraction patterns:

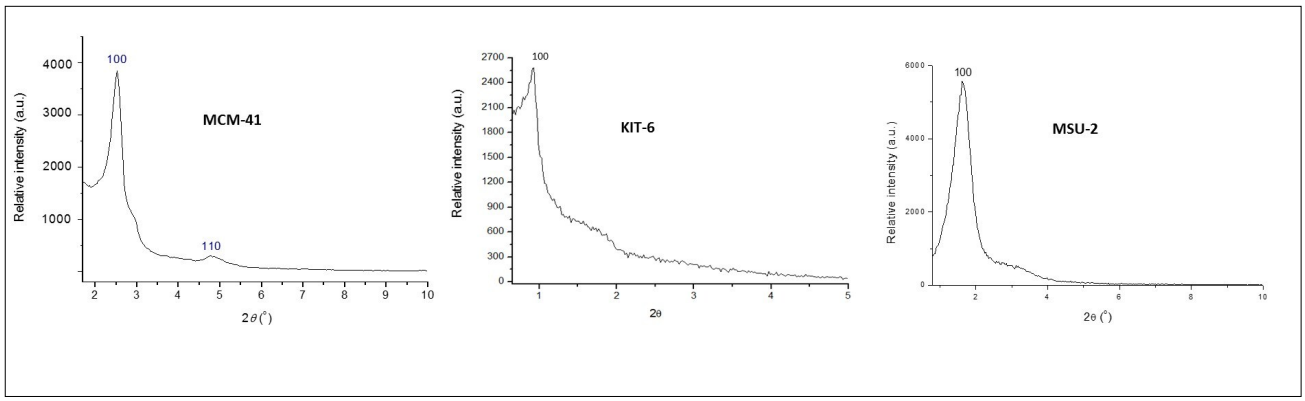

Figure S3. X-ray diffraction patterns of starting materials MCM-41, KIT-6 and MSU-2.

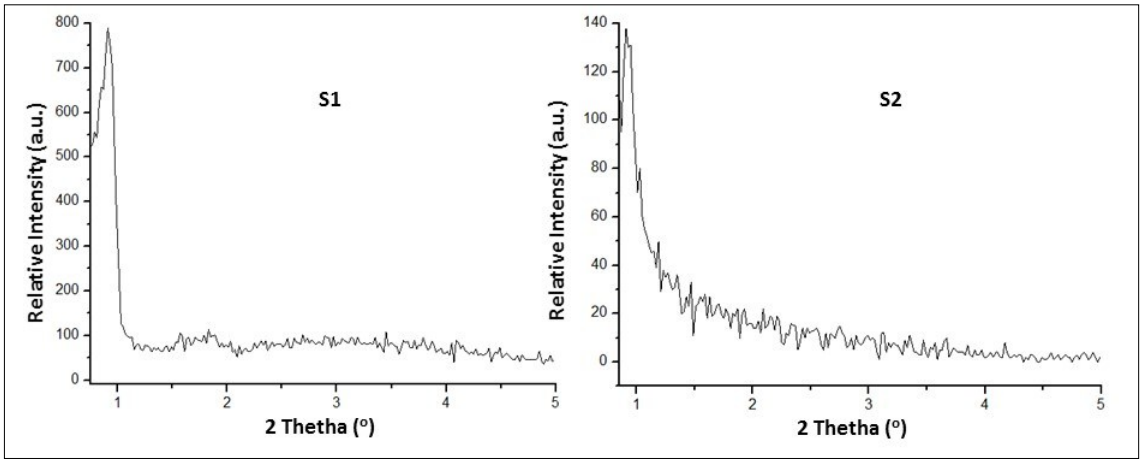

Figure S4. X-ray diffraction patterns of materials **S1** and **S2** (*x axis* = 2Theta (º); *y axis* = Intensity (a. u.).

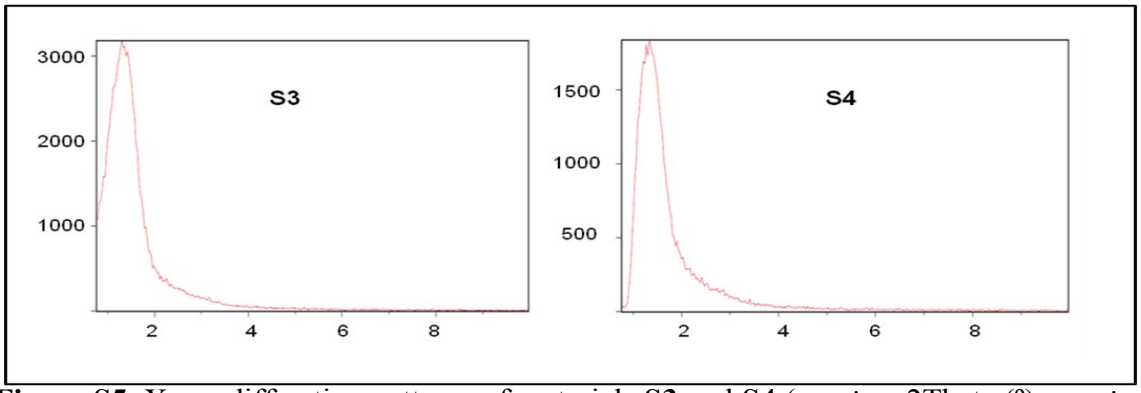

Figure S5. X-ray diffraction patterns of materials **S3** and **S4** (*x axis* = 2Theta (º); *y axis* = Intensity (a. u.).

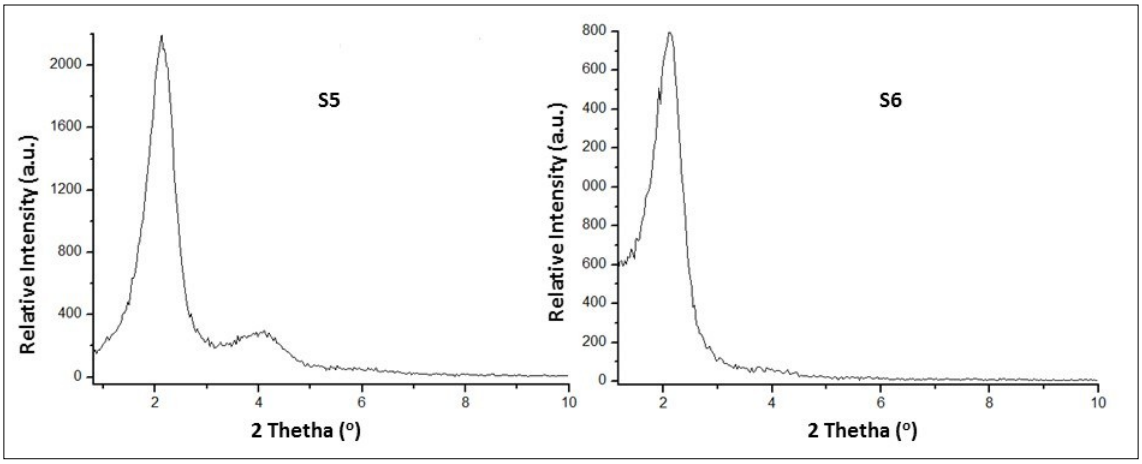

Figure S6. X-ray diffraction patterns of materials **S5** and **S6** (*x axis* = 2Theta (º); *y axis* = Intensity (a. u.).

3. Solid state ^{29}Si-NMR spectroscopy

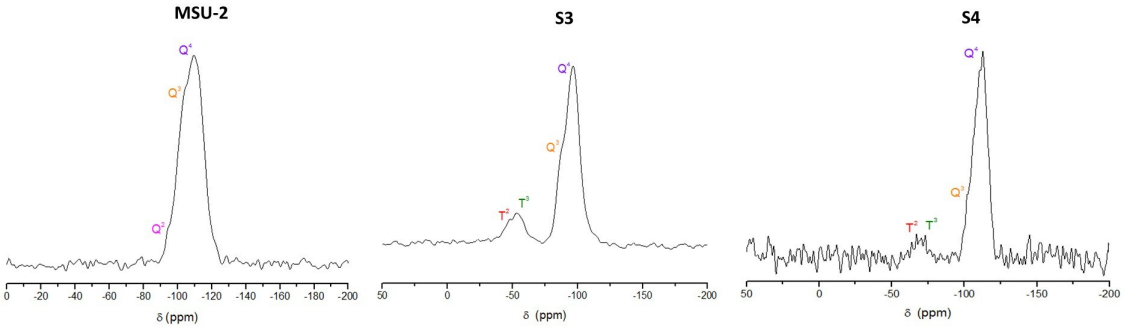

Figure S7. ^{29}Si MAS NMR spectra of materials MSU-2, **S3** and **S4.**

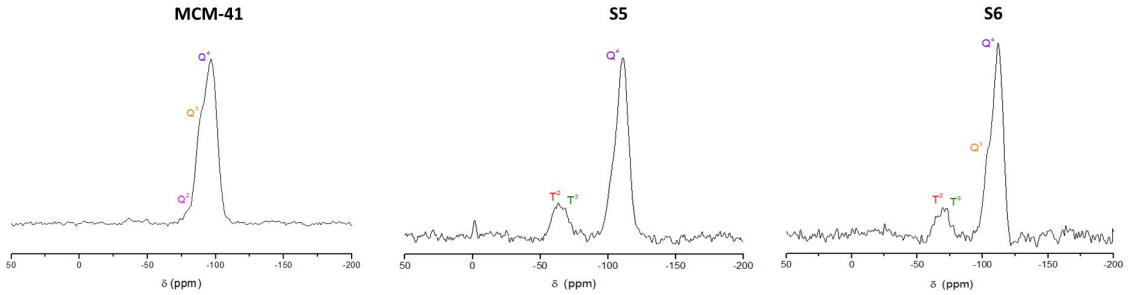

Figure S8. ^{29}Si MAS NMR spectra of materials MCM-41, **S5** and **S6.**

4. FT-IR measurements:

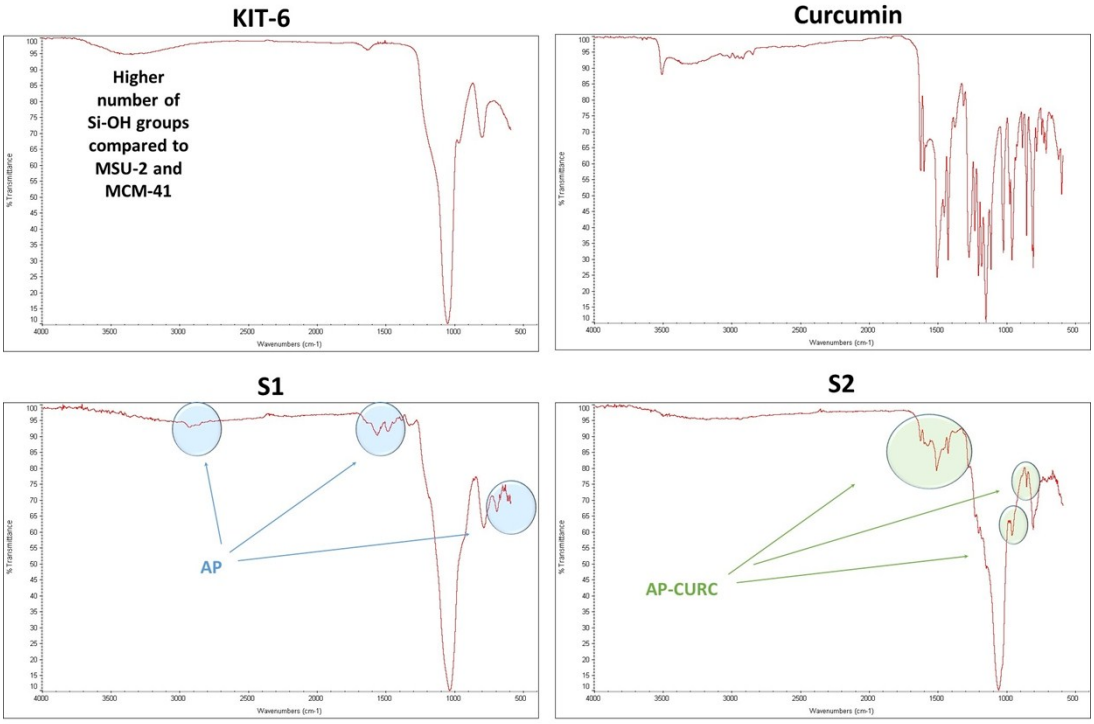

Figure S9. FT-IR spectra of materials KIT-6, **S1**, **S2** and curcumin.

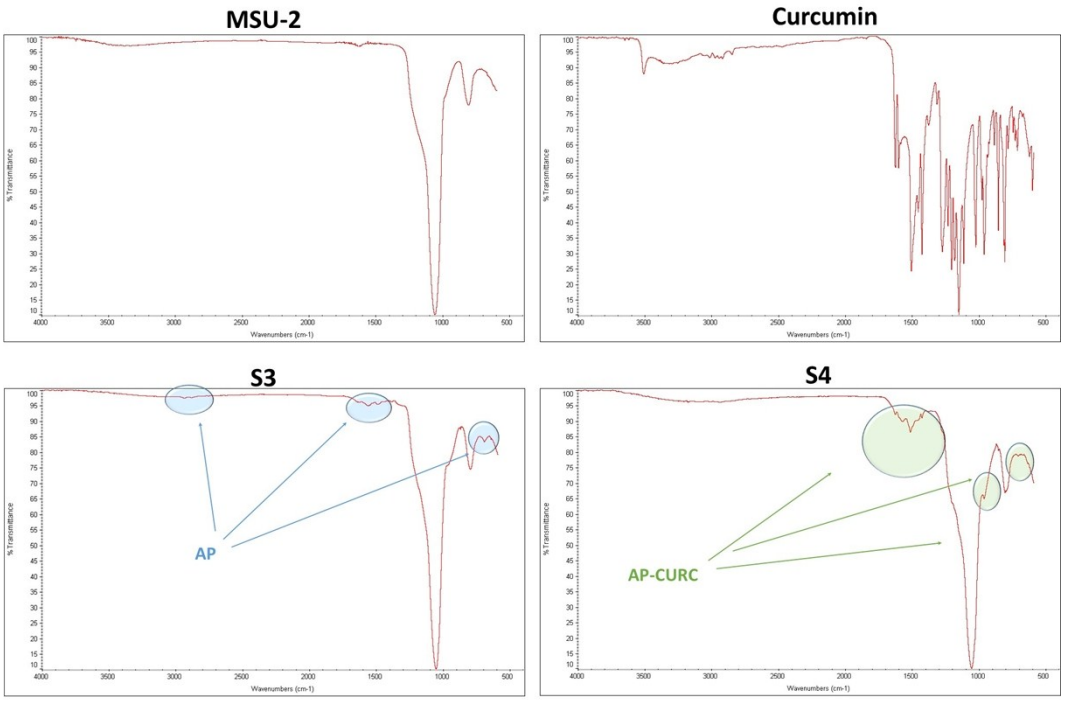

Figure S10. FT-IR spectra of materials MSU-2, **S3**, **S4** and curcumin.

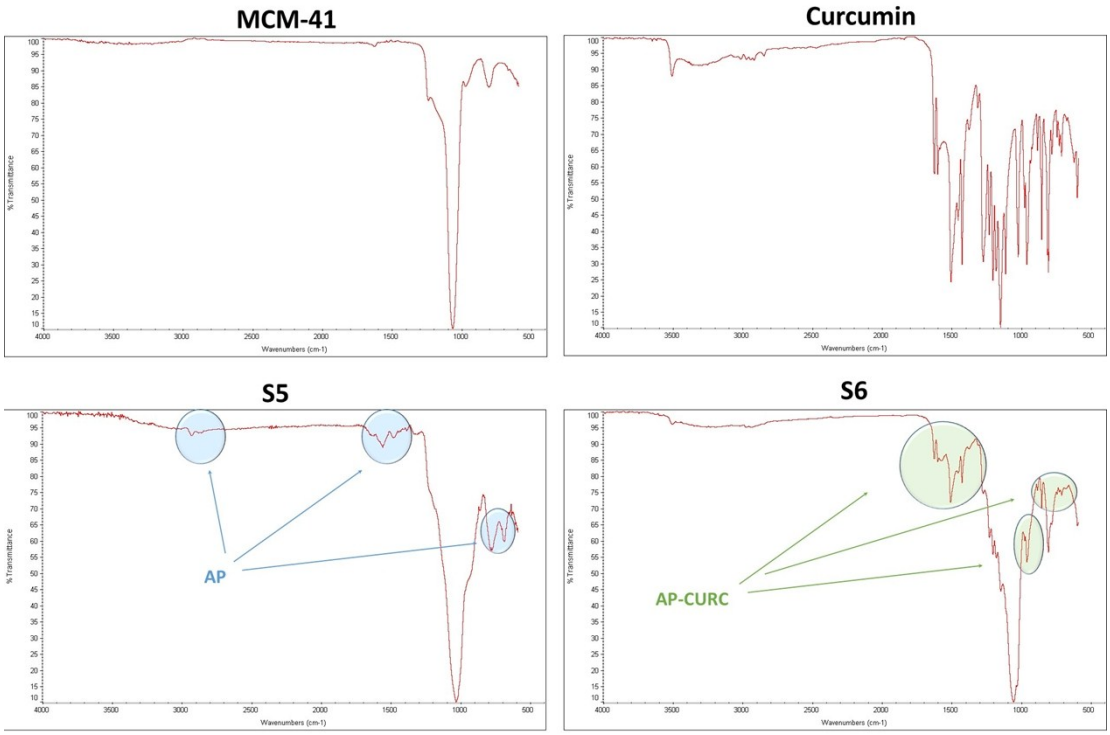

Figure S11. FT-IR spectra of materials MCM-41, **S5**, **S6** and curcumin.

5. Thermogravimetry analysis:

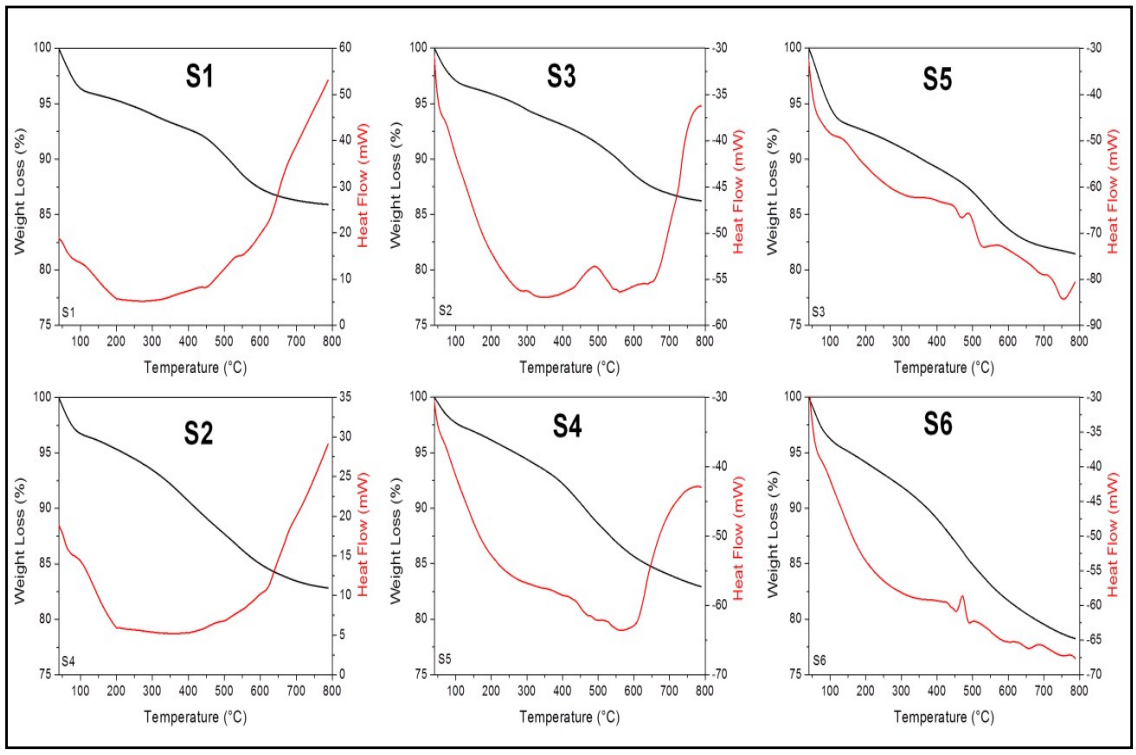

Figure S12. TG measurements of materials **S1-S6**. Exothermic processes take place when the heat flow increases.

6. Additional SEM and TEM images:

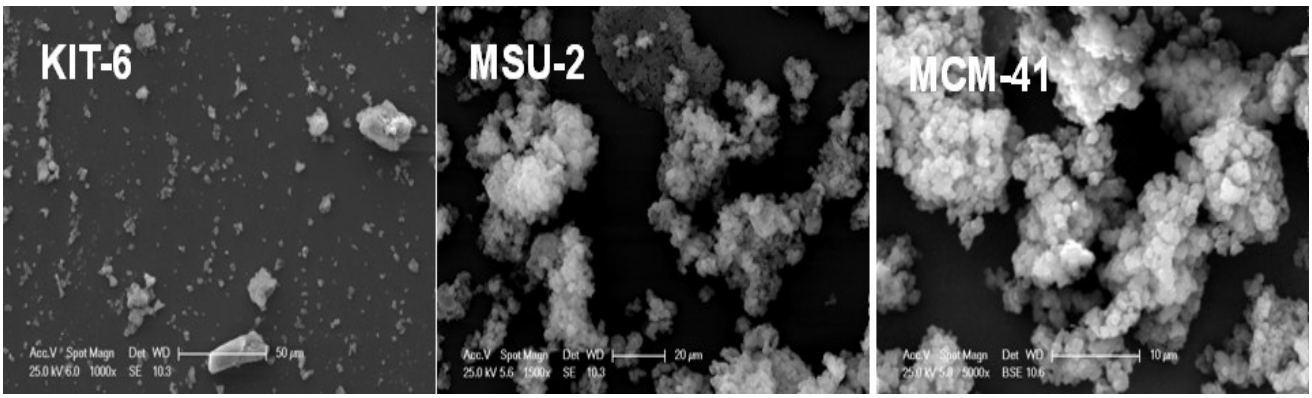

Figure S13. SEM images of materials KIT-6, MSU-2 and MCM-41.

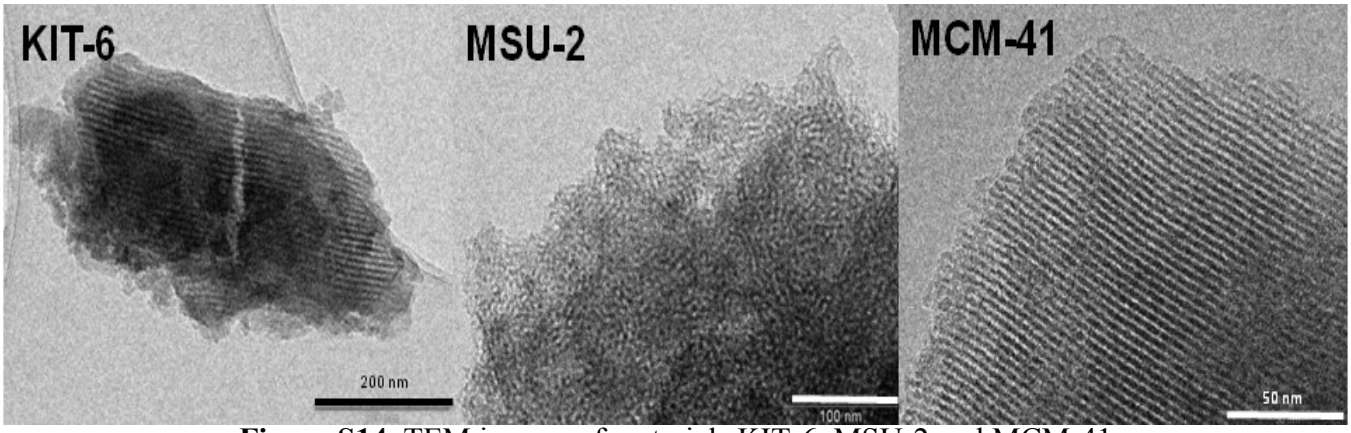

Figure S14. TEM images of materials KIT-6, MSU-2 and MCM-41.

7. DLS study:

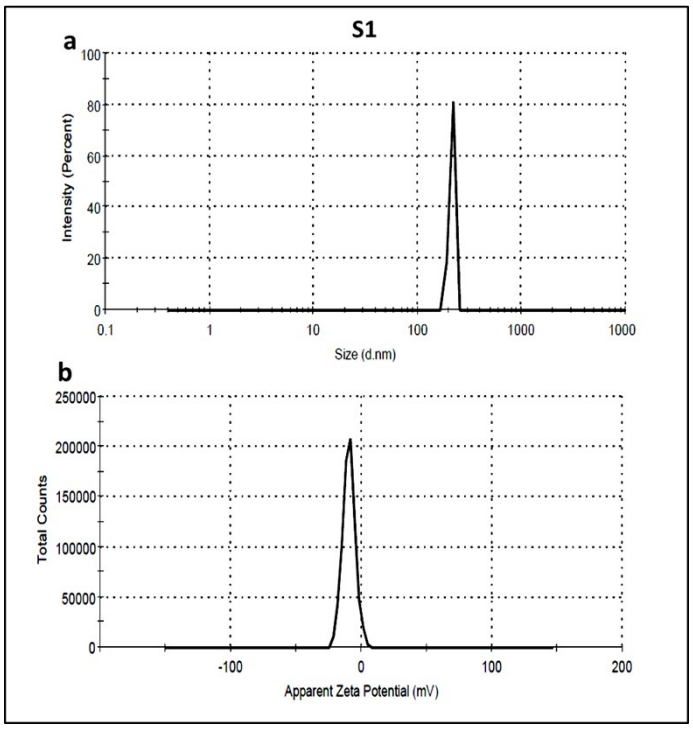

Figure S15. (a) Size (nm) and (b) charge (mV) of **S1** material through DLS study.

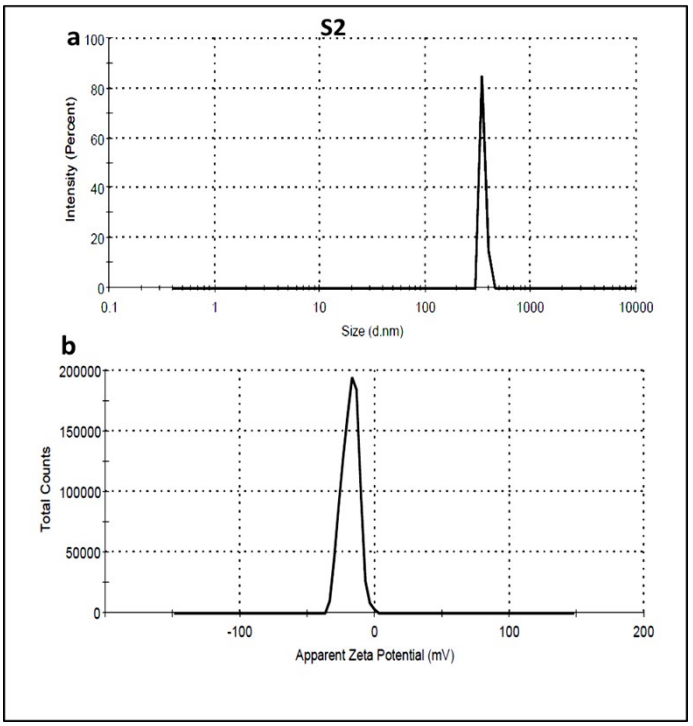

Figure S16. (a) Size (nm) and (b) charge (mV) of **S2** material through DLS study.

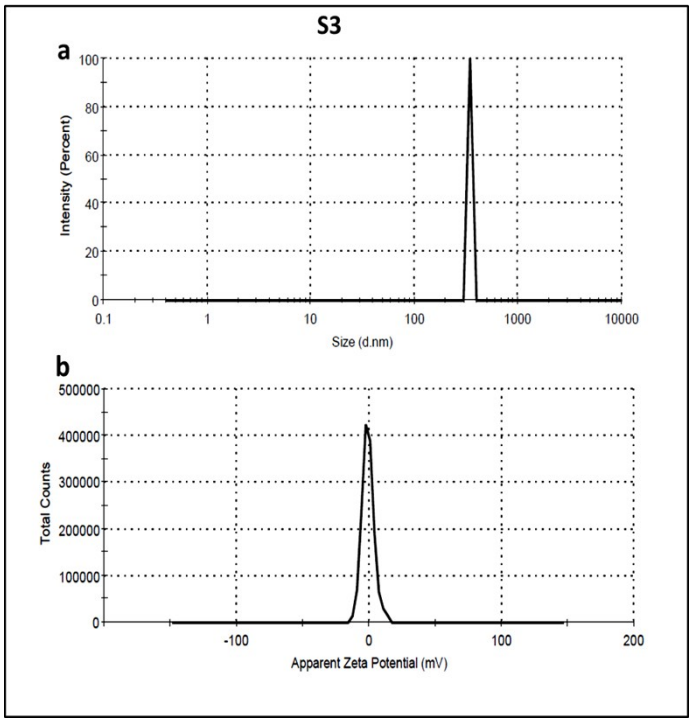

Figure S17. (a) Size (nm) and (b) charge (mV) of **S3** material through DLS study.

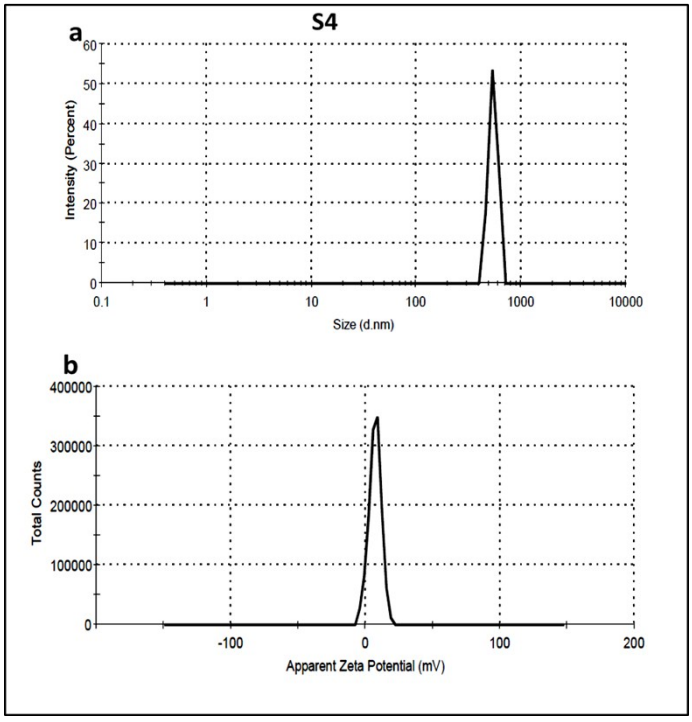

Figure S18. (a) Size (nm) and (b) charge (mV) of **S4** material through DLS study.

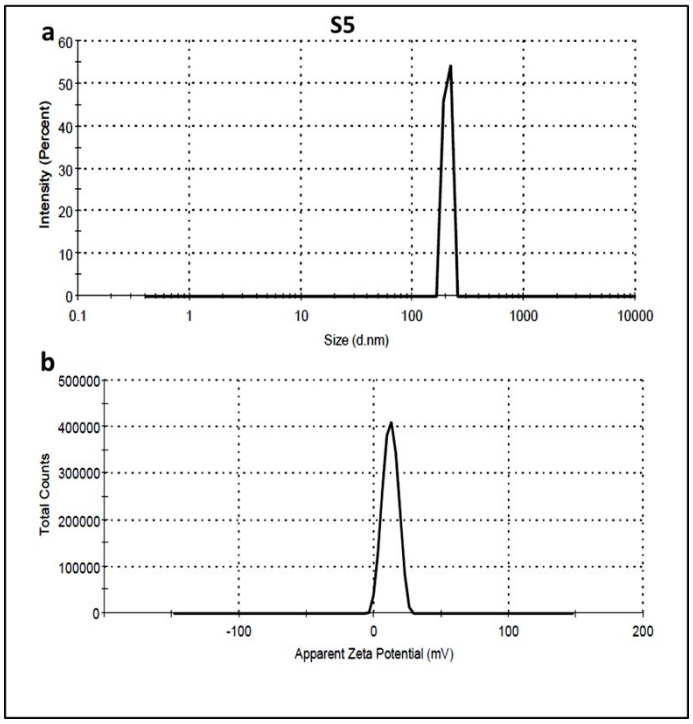

Figure S19. (a) Size (nm) and (b) charge (mV) of **S5** material through DLS study.

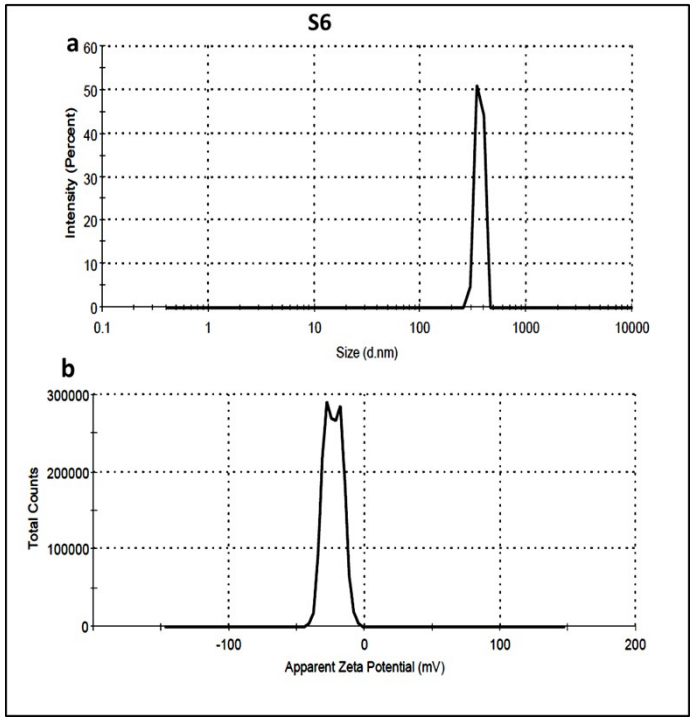

Figure S20. (a) Size (nm) and (b) charge (mV) of **S6** material through DLS study.

8. Internalization study in A549 cells:

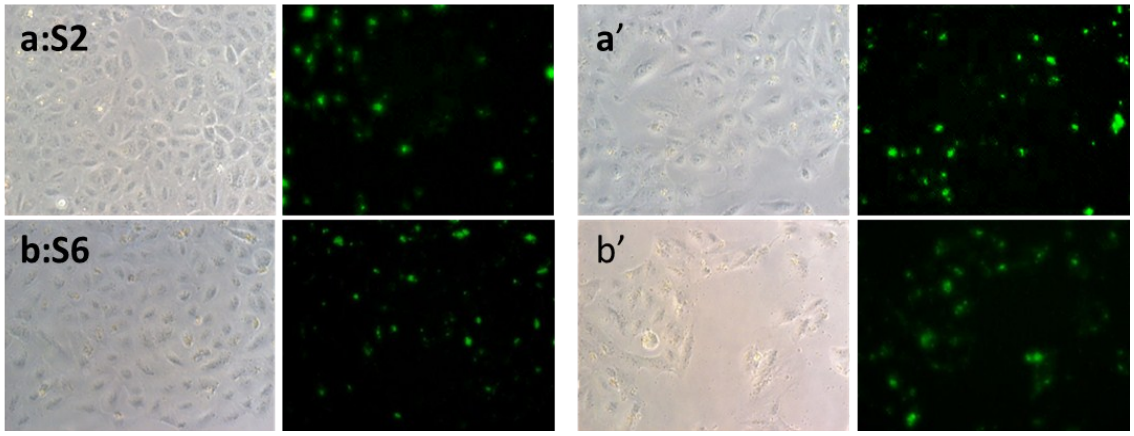

Figure S21. Cellular internalization of **S2** and **S6** materials in A549 cells. Row 1: cells treated with **S2** (10 µM with respect to curcumin); Row 2: cells treated with **S6** (10 µM with respect to curcumin). Column 1 and 2 are the bright field and fluorescent images respectively after 6 hours treatment; column 3 and 4 are the bright field and fluorescent images respectively after 12 hours treatment.

9.Cellular uptake of mesoporous silica

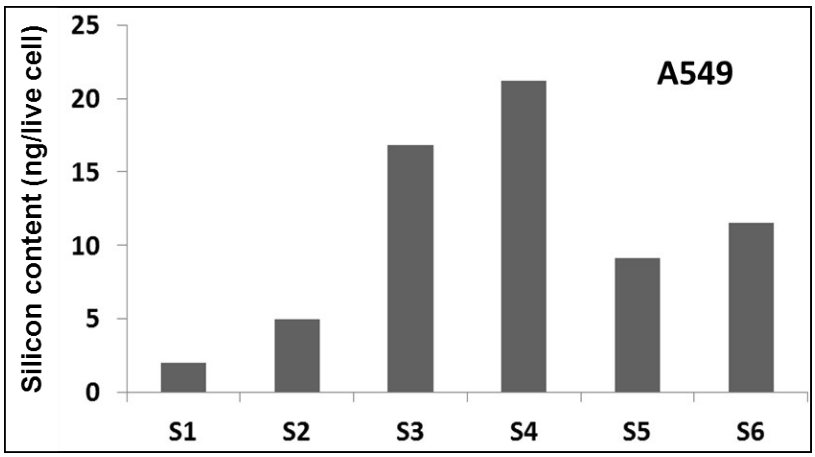

Figure S22. Cellular uptake of mesoporous silica in A549 cell line. This figure indicates the internalization of S1-S6 materials in A549 cells after 6 hours of incubation. Especially S3 and its corresponding curcumin loaded form S4 shows the maximum uptake.

10. Supplementary Tables

Table S1. Functionalization content of **S1**, **S3** and **S5** determined by TGA and by elemental analysis.

Material	% Weight loss (20-100ºC)	% Weight loss (100-600ºC)	% curcumin	%N by elemental analysis experimental (calculated)	%C by elemental analysis experimental (calculated)
S1	3.62	9.08	-	0.78 (0.79) %	3.34 (3.45) %
S3	2.93	8.46	-	0.73 (0.71) %	3.12 (3.29) %
S5	5.31	11.00	-	0.94 (0.96) %	4.04 (4.18) %

Table S2. Comparison of particle size by SEM and DLS

Material	Size by SEM images[a]	Size by DLS measurements[b]
S1	9.4±2.1 μm (aggregates)	5577
S2	10.0±2.3 μm (aggregates)	1983
S3	473±121 nm (particle) form aggregates of ca. 1315±189 nm	3781
S4	480±66 nm (particle) form aggregates of ca. 1277±156 nm	1915
S5	729±87 nm	2124
S6	618±157 nm	1233

[a] = Calculated with the software ImageJ, the SEM images have been obtained in solid state without any previous dispersion step.
[b] = Calculated by DLS using a suspension of the materials.