Supporting information

Graphene from Sugar and its Application in Water Purification

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Supporting information 1

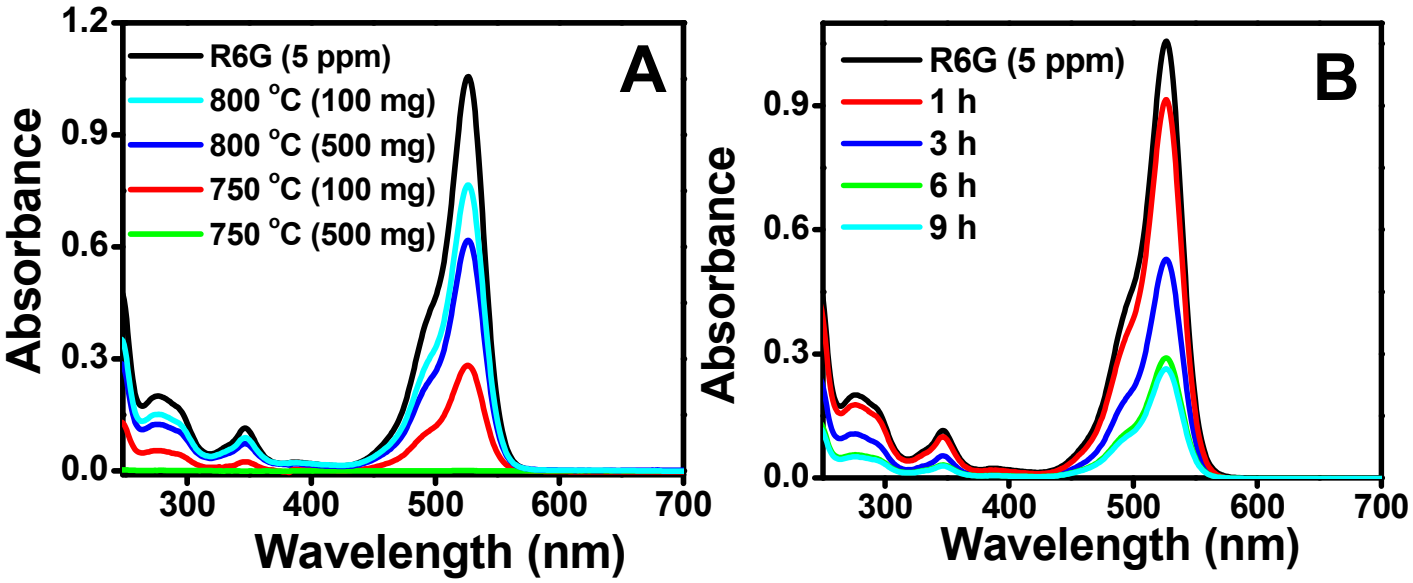

Figure S1: A) Optimization of heating temperature. B) Optimization of heating time.

The prepared material (GSC) shows better adsorption capacity at 750 ^{o}C, as shown in Figure 3A in the manuscript. Further heating this material to 800 ^{o}C, reduces its adsorption capacity. In this Figure S 1A, it can be seen that 500 mg of GSC_{750} removes 5 ppm of R6G completely, whereas, the same amount of sample prepared at 800 ^{o}C is unable to do so. Therefore, the optimum temperature is taken as 750 ^{o}C. During preparation of the material GSC_{750}, heating time was important to optimize. In the Figure S 1B, it can be seen that the adsorption capacity increases when the time for graphitization is increases from 1 h to 3 h and further increases for sample heated for 6 h, but there is no significant change in adsorption capacity when the material was heated for 9 h. Therefore, the optimum heating time was concluded to be 6 h.

Supporting information 2

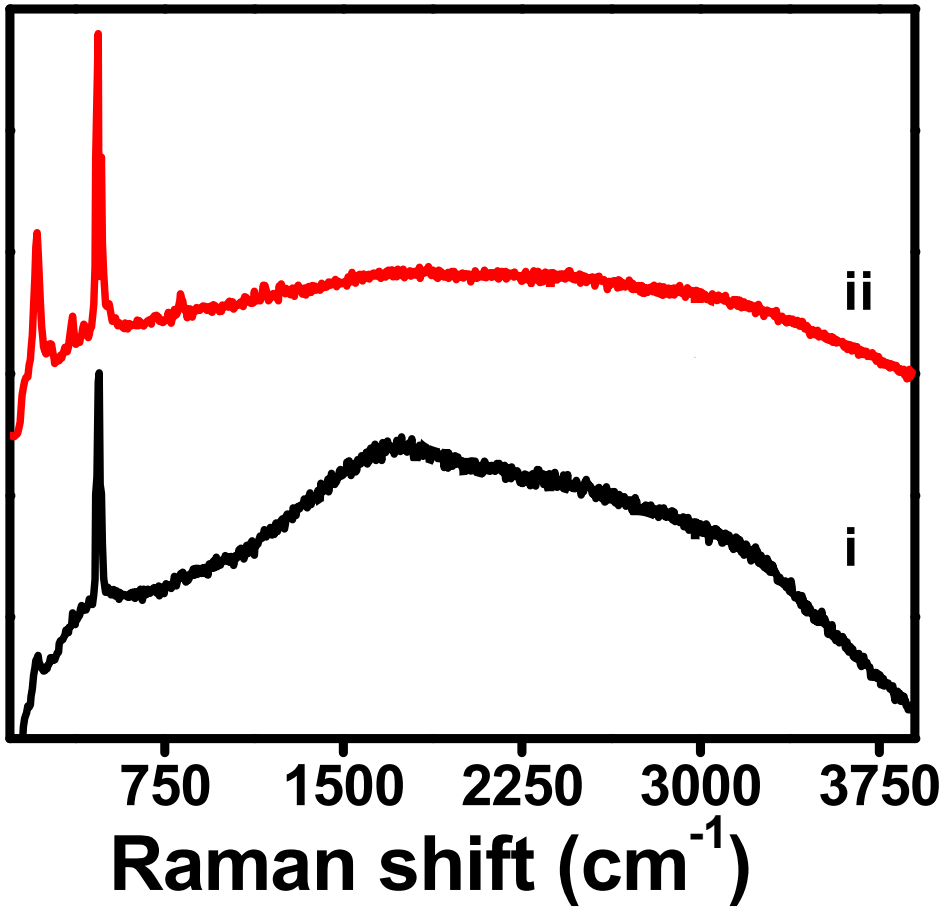

Figure S2: Raman spectra of (i) sand and (ii) sugar coated sand showing an intense peak at 470 cm^{-1} corresponding to Si-O stretching.

Supporting information 3

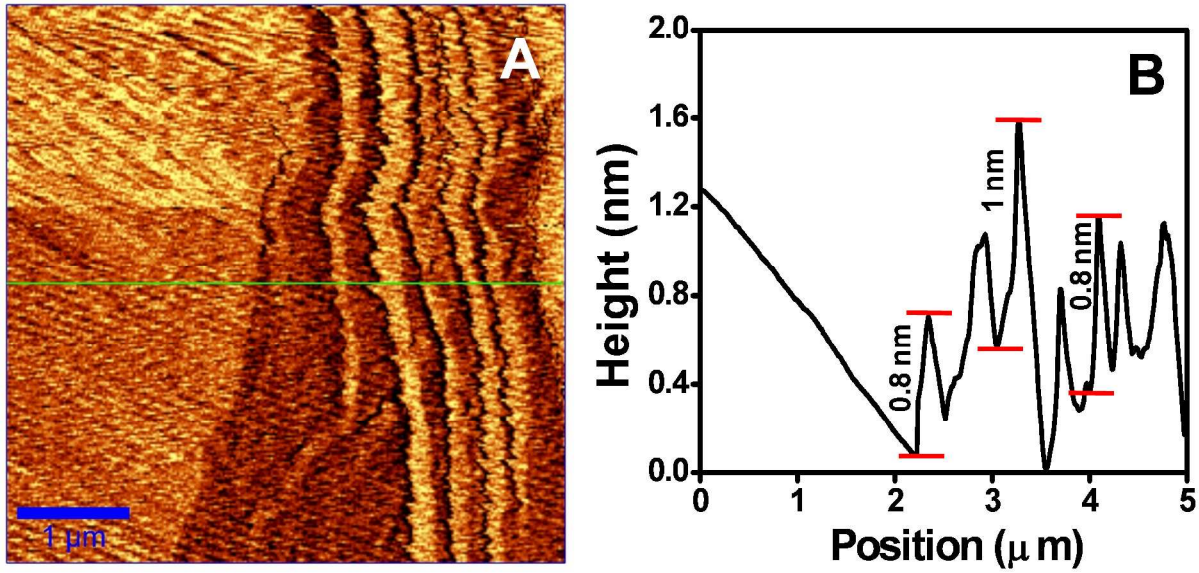

Figure S3: A) AFM image of extracted graphene and B) the height profile showing few layered graphene.

Supporting information 4

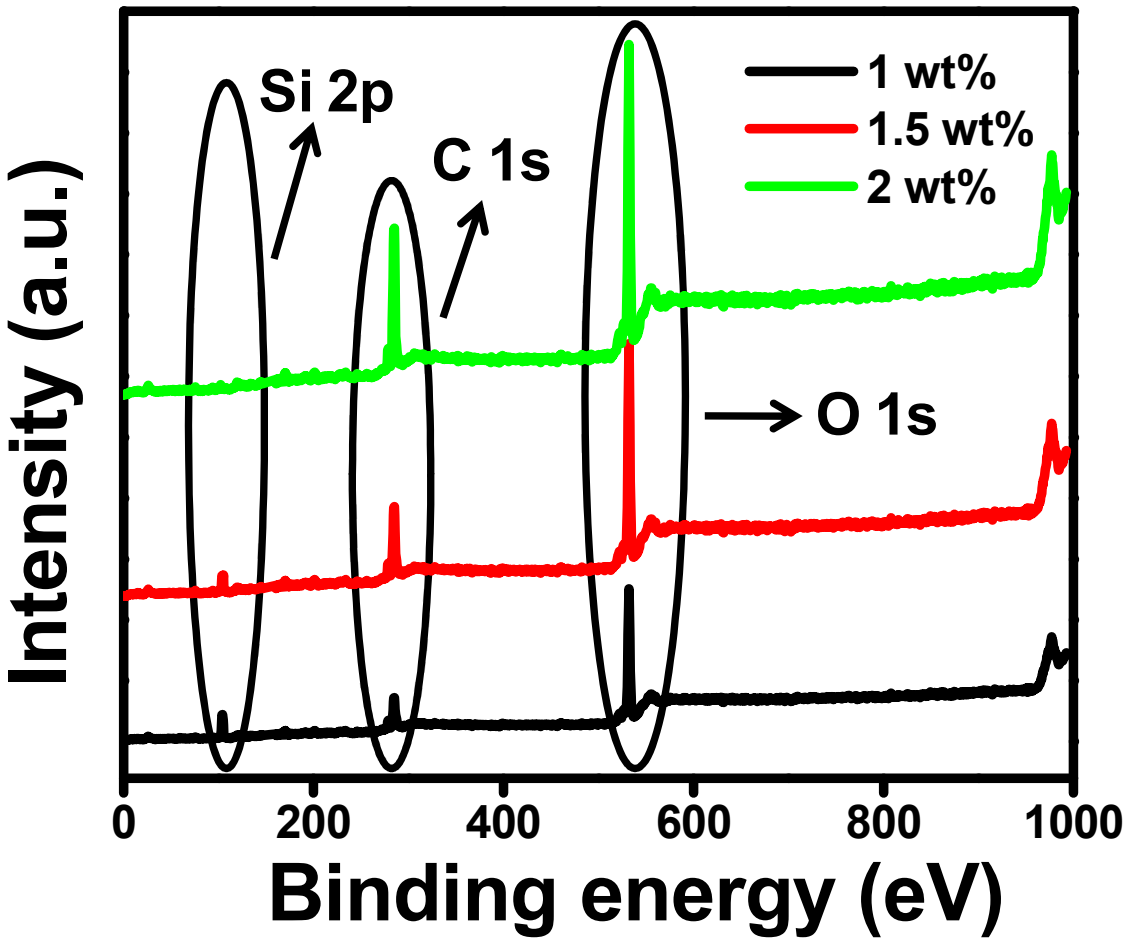

Figure S4: XPS of GSC at different carbon loadings. With the increase in the loading from 1% to 2%, it is clearly seen that the C 1s and O 1s peak intensities increase, whereas, the intensity of Si 2p peak decreases. The disappearance of Si 2p peak at 2% loading indicates complete masking by carbon.

Supporting information 5

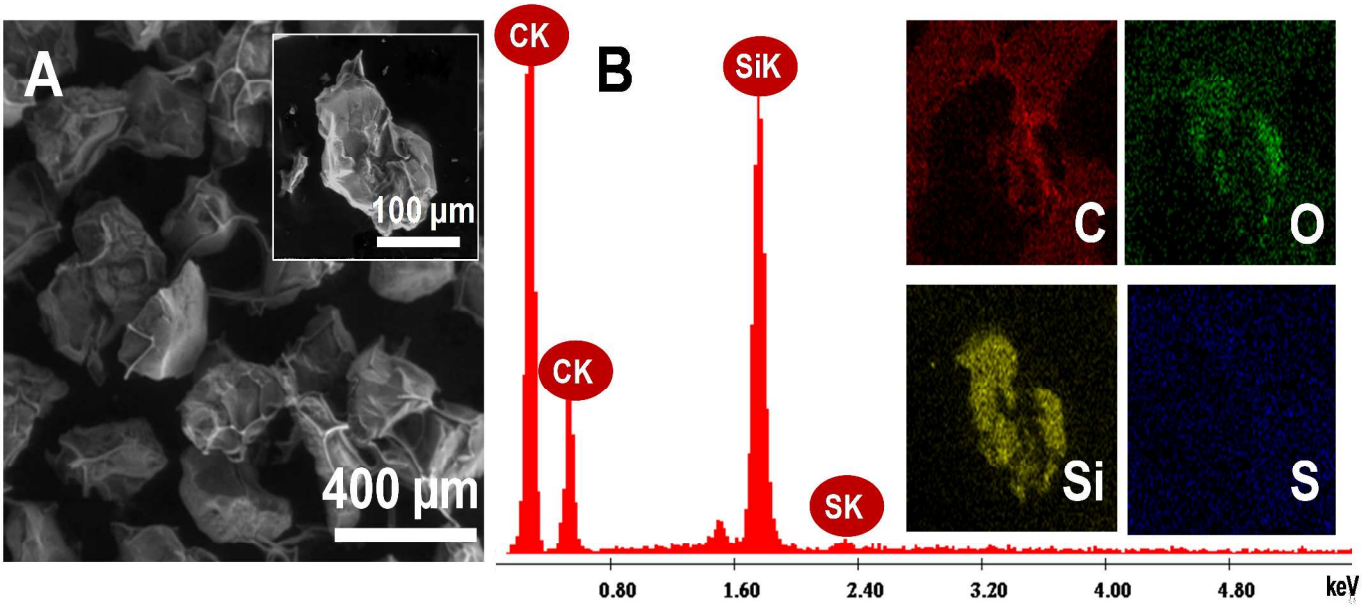

Figure S5: (A) SEM image of GSC after acid wash. Inset shows the image of a single particle. (B) EDAX and elemental mappings.

On comparing Figure S 5A with Figure 1C, we see that there is no change in morphology after treatment with concentrated sulphuric acid. A small amount of sulphur is incorporated into the sample after acid wash which probably leads to activation of the sample.

Supporting information 6

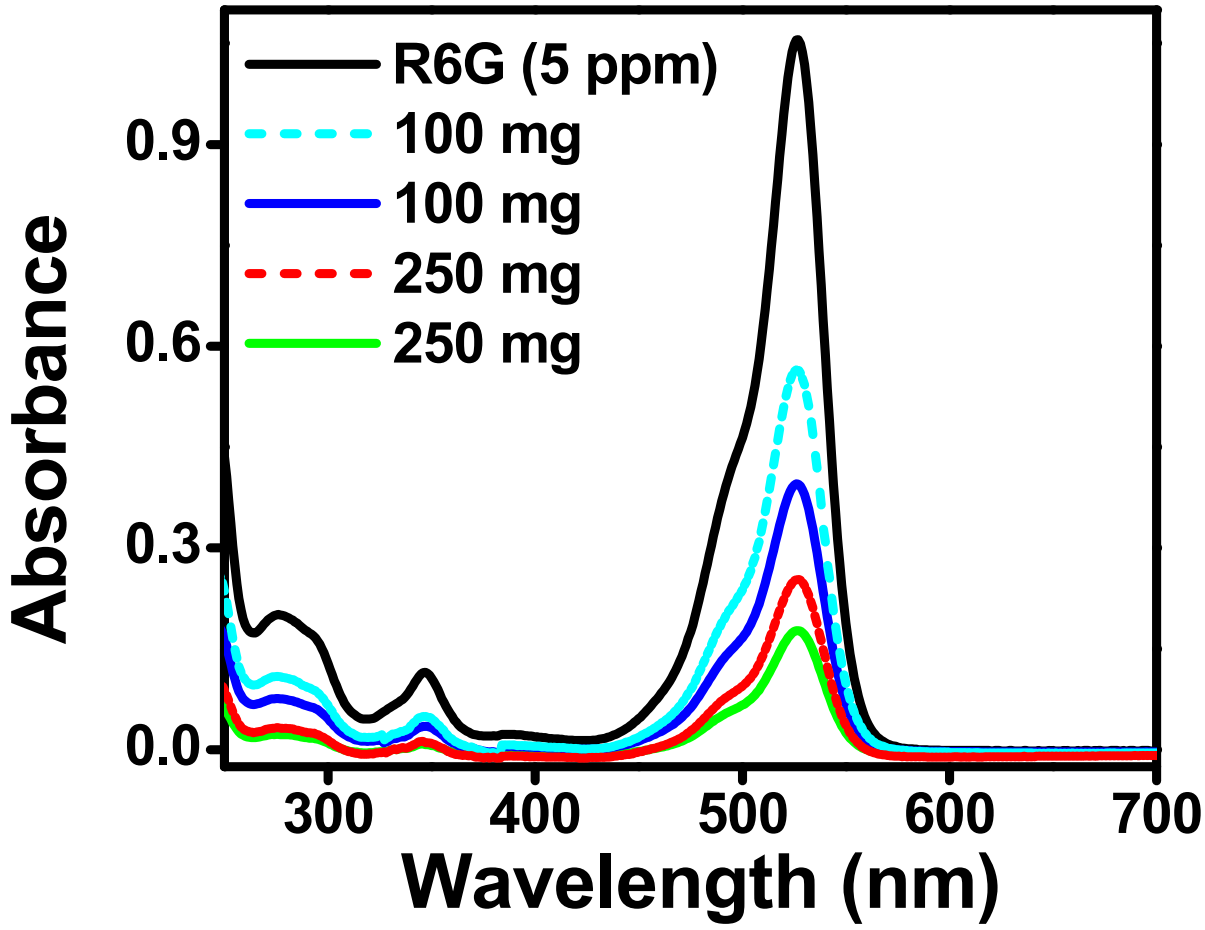

Figure S6: UV/Vis. absorption spectra of R6G left in solution after treating the test solution with GSC. Dotted lines: After treatment with as-prepared GSC. Solid lines: After treatment with acid-washed GSC. Black line: The test solution before treatment. We infer that the adsorption capacity of GSC improves after acid wash.

Supporting information 7

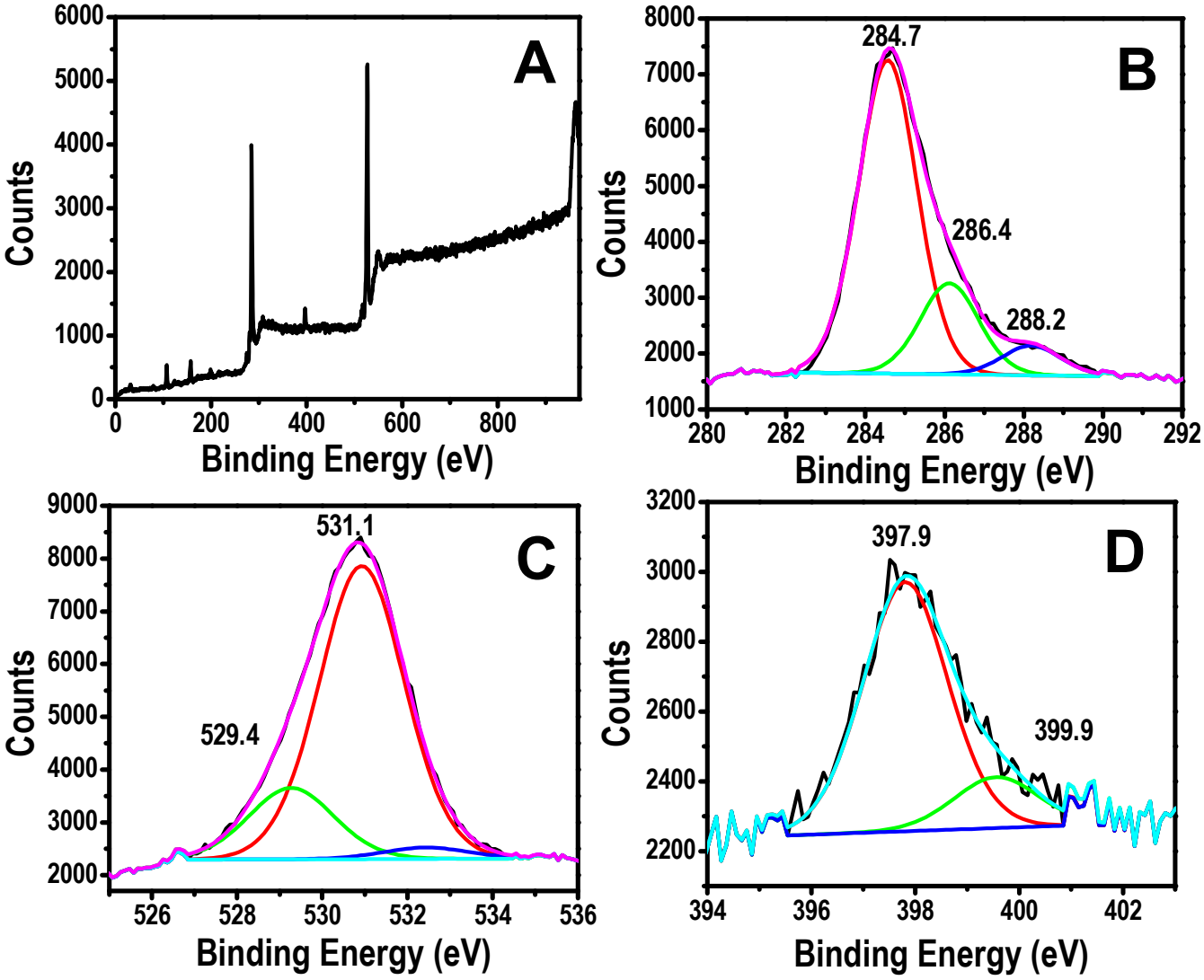

Figure S7: XPS analyses of R6G-adsorbed GSC_{750}. (A) shows the survey spectrum. B, C and D show the deconvoluted XPS of C 1s, O 1s and N 1s regions, respectively. N 1s is absent in the parent material, see for example Figure 1B.

Supporting information 8

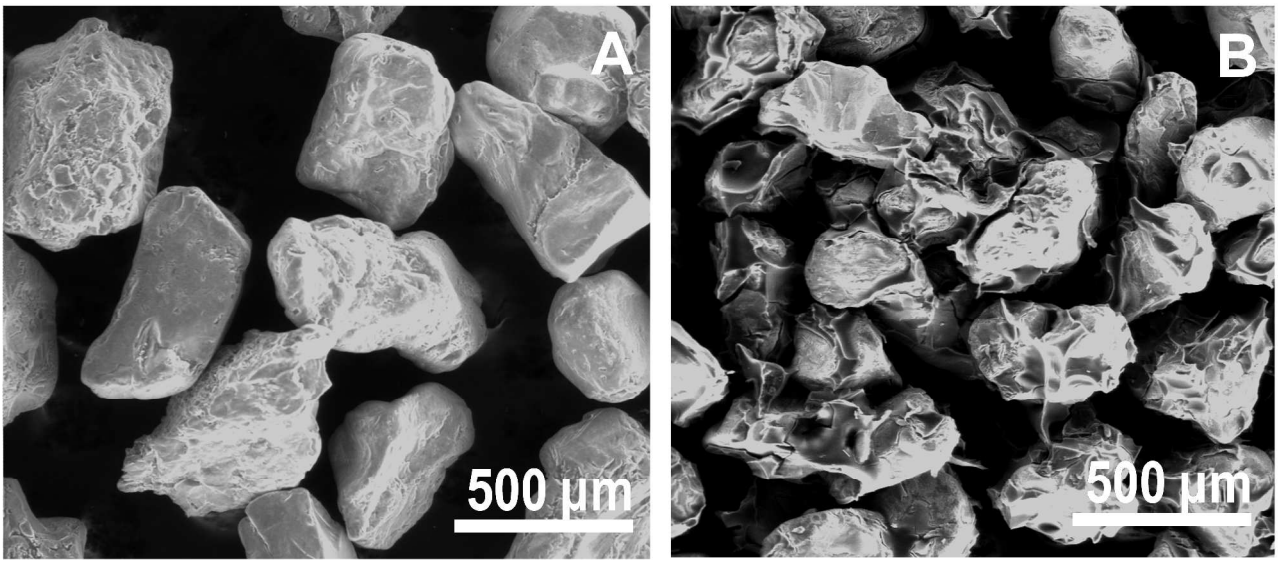

Figure S8: SEM images of (A) sand and (B) GSC_{750} after removal of R6G by treatment with acetone.