A picture containing text, map

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**S1.** FT-IR spectrum of not-adsorbed MB dye on hydrogels and nanocomposite hydrogels



**S2.** SEM image of SiO2 nanoparticles -5000 x magnification



**S3.** Morphological structure of (a) AA hydrogel, (b) AA-1% SiO2 , (c) AA-0.05% SiO2 and (d) AA-0.5% SiO2 nanocomposite hydrogels not-adsorbed MB dye -1000 x magnification



**S4.** Morphological structure of (a) AA-*co*-VP (3:1), (b) AA-*co*-VP (2:2) and (c) AA-*co*-VP (1:3) hydrogels not-adsorbed MB dye -5000 x magnification



**S5.** Morphological structure of (a) AA-*co*-VP (3:1), (b) AA-*co*-VP (3:1)- 1% SiO2 and (c) AA-*co*-VP (3:1)- 0.5% SiO2 (d) AA-*co*-VP (3:1)- 0.05% SiO2 hydrogels not-adsorbed MB dye -10.000 x magnification