Supporting Information for

In situ Synthesis and Biocompatibility of Nano Hydroxyapatite on Pristine and Chitosan Functionalized Graphene Oxide

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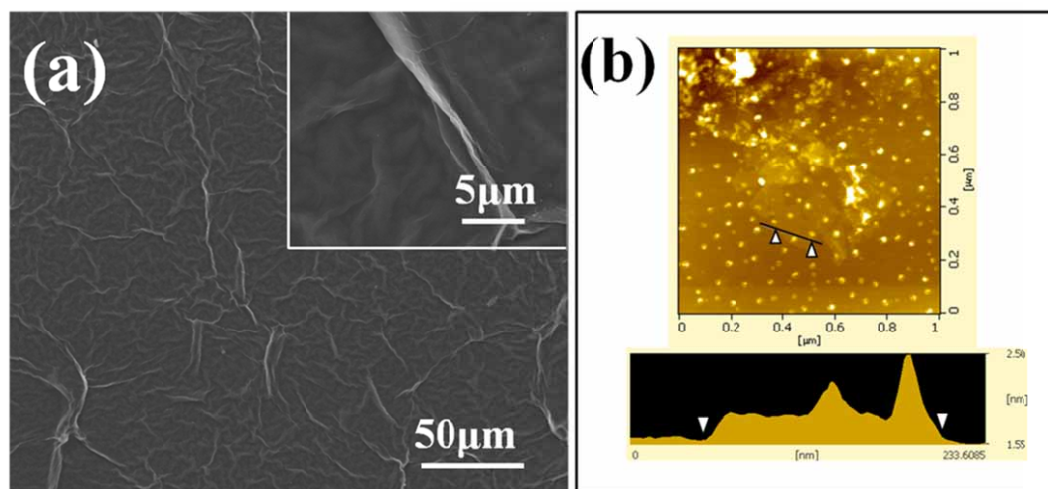**The SEM and AFM analysis of GO sheets**

Figure S1. SEM image (a) of GO sheets. The AFM image and sectional analysis (b) of GO sheets.

As an intrinsic property of graphene oxide sheets, folds and scrolls can be observed at the GO surface in Fig.S1(a). The AFM analysis indicates that the GO sheets are highly exfoliated with sheet thickness less than 1 nm[1].The observed particles may result from the small amount of impurities an inadequate exfoliated GO stacks.

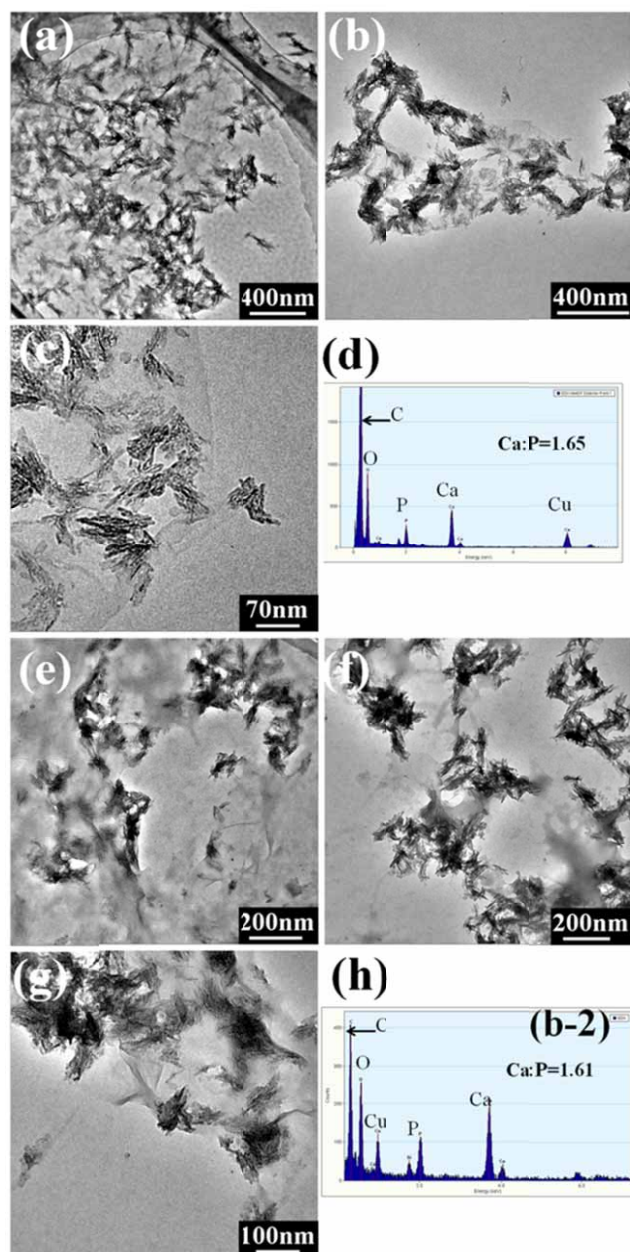**TEM images and EDX analysis of the nanocomposites**

Figure S2. TEM images of GO/HA (a, b and c) and CS-GO/HA (e, f and g). The EDX spectra of GO/HA (d) and CS-GO/HA (h).

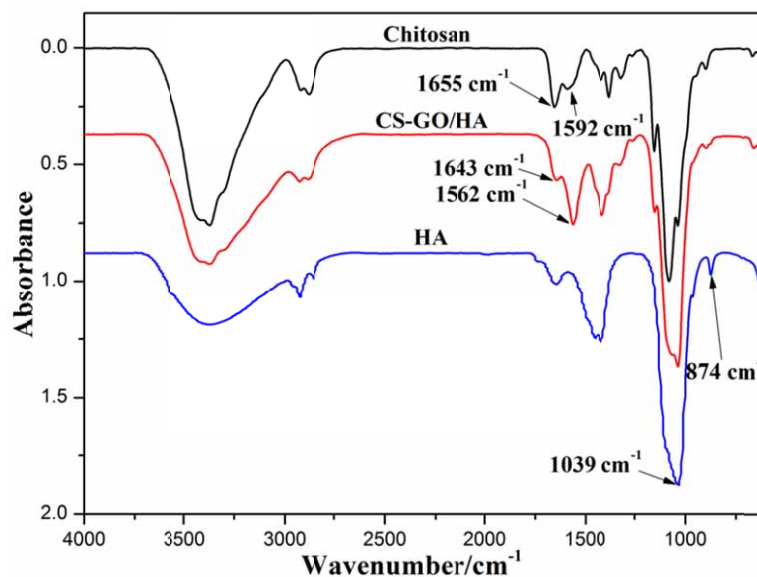**FTIR analysis of the nanocomposites**

Figure S3. The FTIR spectra of Chitosan and CS-GO/HA composites

The formation of HA on GO surface (GO/HA) is further identified by the stretching band of phosphate at around 1039 cm^{-1} and the stretching band of carbonate/acid phosphate groups at about 874 cm^{-1}, which can be also observed in the case of CS-GO/HA.

The two characteristic absorbance bands in the spectrum of pure CS at 1655 cm^{-1} and 1592 cm^{-1} are assigned to the C=O stretching vibration of -NHCO- and the N-H bending of -NH$_2$, respectively. However, these two peaks of the CS-GO/HA are shifted to a lower wave number (from 1655 cm^{-1} to 1643 cm^{-1} and 1592 cm^{-1} to 1592 cm^{-1}, respectively), probably due to the synergistic effect of hydrogen bonding between CS and the oxygenated groups in GO. [2]
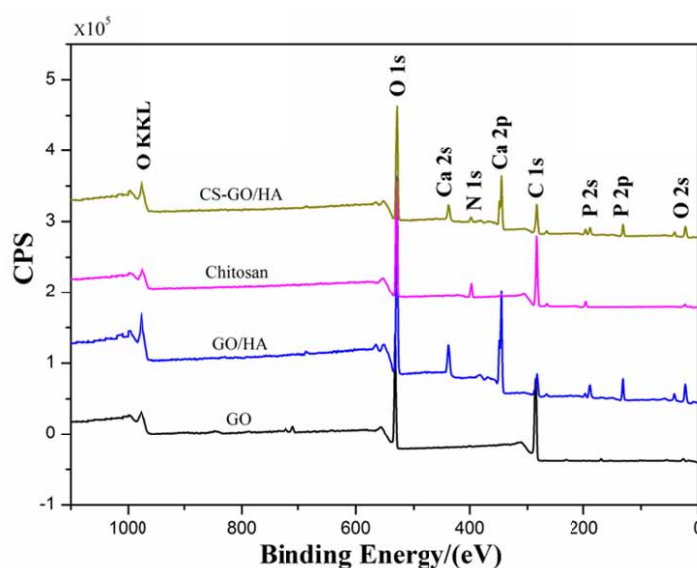
XPS analysis of the composites

Figure S4. The survey XPS spectra of GO, chitosan, GO/HA and CS-GO/HA nanocomposites

Table S1. The elemental composition of GO, GO/HA, CS and CS-GO/HA determined by XPS analysis

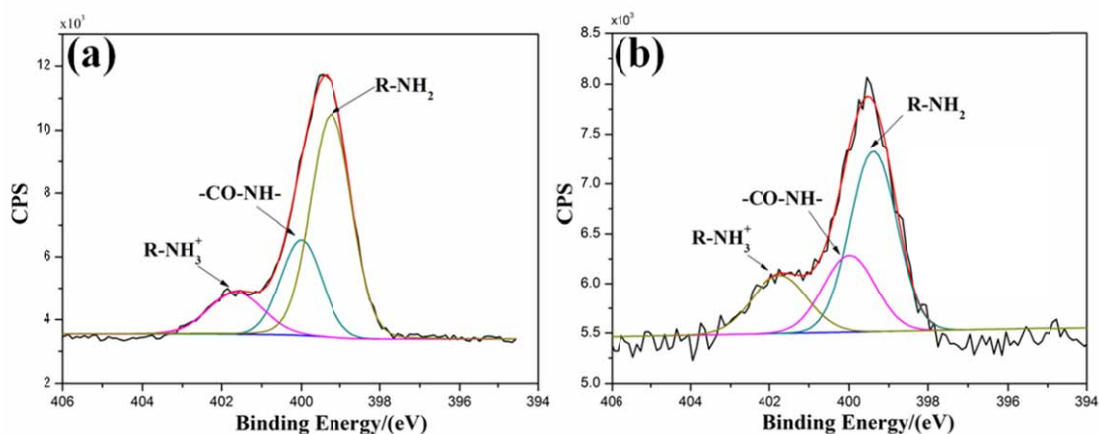|	C	O	Ca	P	N	Ca:P
GO	72.20%	27.80%	0	0	0	
GO/HA	22.20%	47.80%	17.90%	12.10%	0	1.48
CS	64.46%	28.96	0	0	6.58	
CS-GO/HA	35.50%	40.50%	12.60%	9.10%	2.40%	1.38

Figure S5. The high resolution XPS spectra of N 1s of Chitosan(a) and CS-GO/HA(b) nanocomposites

Table S2. The elemental composition of chitosan and CS-GO/HA determined by XPS analysis

	$R\text{-}NH_3^+$	-CO-NH-	$R\text{-}NH_2$
CS	14.3%	24.8%	60.8%
CS-GO/HA	20.8%	25.4%	53.8%

By fitting the distribution of N1s in Fig.S5 using Gaussian/ Lorenz curve, three peaks were obtained for both of them. The peaks centered at 399.4 eV, 400.5 eV, and 401.7 eV are consistent with amine ($R\text{-}NH_3^+$), amide (CO-NH-), and the protonated amine species ($R\text{-}NH_2$), respectively [2-3]. The quantitative fitting results in Table S2 indicate that the content of $R\text{-}NH_3^+$ component in the total of N1s line increased from 14.3% in CS to 20.8% in CS-GO/HA, which can be ascribed to the formation of electrostatic interaction between the negative charge on the surface of GO and N groups of CS [2].

1. H. Tang, G. J. Ehlert, Y. Lin and H. Sodano, *Nano Lett.,* 2012, **12**, 84-90.

2. X. M. Yang, Y. F. Tu, L. A. Li, S. M. Shang and X. M. Tao, *ACS.Appl.Mater.Inter.*, 2010, **2** , 1707-1713.

3. G. Ke, W. Guan, C. Tang, D. Zeng and F. Deng, *Biomacromolecules*, 2007, **8**, 322-326.