

Electronic Supplementary Information for the Manuscript:

Investigation of Various Fatty Acids Surfactants on the Microstructure of Flexible Hydroxyapatite Nanofibers

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Materials and characterization

Linoleic acid ($C_{18}H_{32}O_2$, > 95%(GC)), oleic acid ($C_{18}H_{32}O_2$, AR), and ricinoleic acid ($C_{18}H_{34}O_3$, $\geq 95\%$ (T)) were purchased from Aladdin Industrial Co. Ltd.. Stearic acid ($C_{18}H_{36}O_2$, AR), palmitic acid ($C_{16}H_{32}O_2$, AR), anhydrous calcium chloride ($CaCl_2$, AR), sodium hydroxide (NaOH, AR) and sodium dihydrogen phosphate dihydrate ($NaH_2PO_4 \cdot 2H_2O$, AR) were purchased from Sinopharm Chemical Reagent Co. Ltd. All chemical reagents were used as received and without any further purification.

The X-ray powder diffraction (XRD) patterns of the as-prepared samples were recorded using an X-ray diffractometer (Rigaku DMAX-2500PC, Cu $K\alpha$ radiation, $\lambda = 1.5418 \text{ \AA}$). The functional groups of the products were characterized using Fourier transform infrared spectroscopy (FT-IR) (Thermo Nicolet Nexus 670). Thermogravimetric (TG) curves of the samples were measured on a thermal analyzer (Netzsch TG209) at a heating rate of $10 \text{ }^\circ\text{C} \cdot \text{min}^{-1}$ in a flow of air. Field-emission scanning electron microscopy (FESEM) images of the as-prepared products were recorded with a field-emission scanning electron microscope (JEOL JSM-7800F). Element contents of corresponding samples are analyzed by an energy dispersive spectrometer (EDS) analyzer (Oxford instruments X-max 80). TEM (JEOL JEM-2100) was conducted to analyze the morphology and crystal lattice of the as-prepared HA nanofibers.

The crystallinity degrees (X_C) of the as-prepared products were calculated using¹:

$$X_C = 1 - \frac{V_{112/300}}{I_{300}}$$

The crystallite sizes (D_{hkl}) were calculated using the ‘Debye-Scherrer equation’². The lattice parameters were made using MDI Jade 6.5³.

References

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Table S1. Summary of characteristics of the as-prepared samples.

Sample ID	Fatty acids	Crystallinity /%	Ca/P ratio of the product	Crystallite size*			Lattice parameter	
				D_{211}/nm	D_{300}/nm	D_{300}/D_{211}	$a/\text{\AA}$	$c/\text{\AA}$
NF1	linoleic acid	83.54	1.53†; 1.10	42.38	45.29	1.07	9.4029	6.9008
NF2	oleic acid	93.06	1.33	26.74	33.42	1.25	9.4148	6.9031
NF3	ricinoleic acid	89.35	1.46†; 1.30	19.96	52.79	2.64	9.3566	7.0253
NF4	stearic acid	94.82	1.55†; 1.29	10.44	62.78	6.01	9.4297	7.0322
NF5	palmitic acid	86.01	1.33	19.12	24.66	1.29	9.4425	6.9233

*Note: D_{hkl} is the crystallite size in the direction perpendicular to the (hkl) lattice plane.

†Note: data represents the Ca/P ratio of HA microrod.

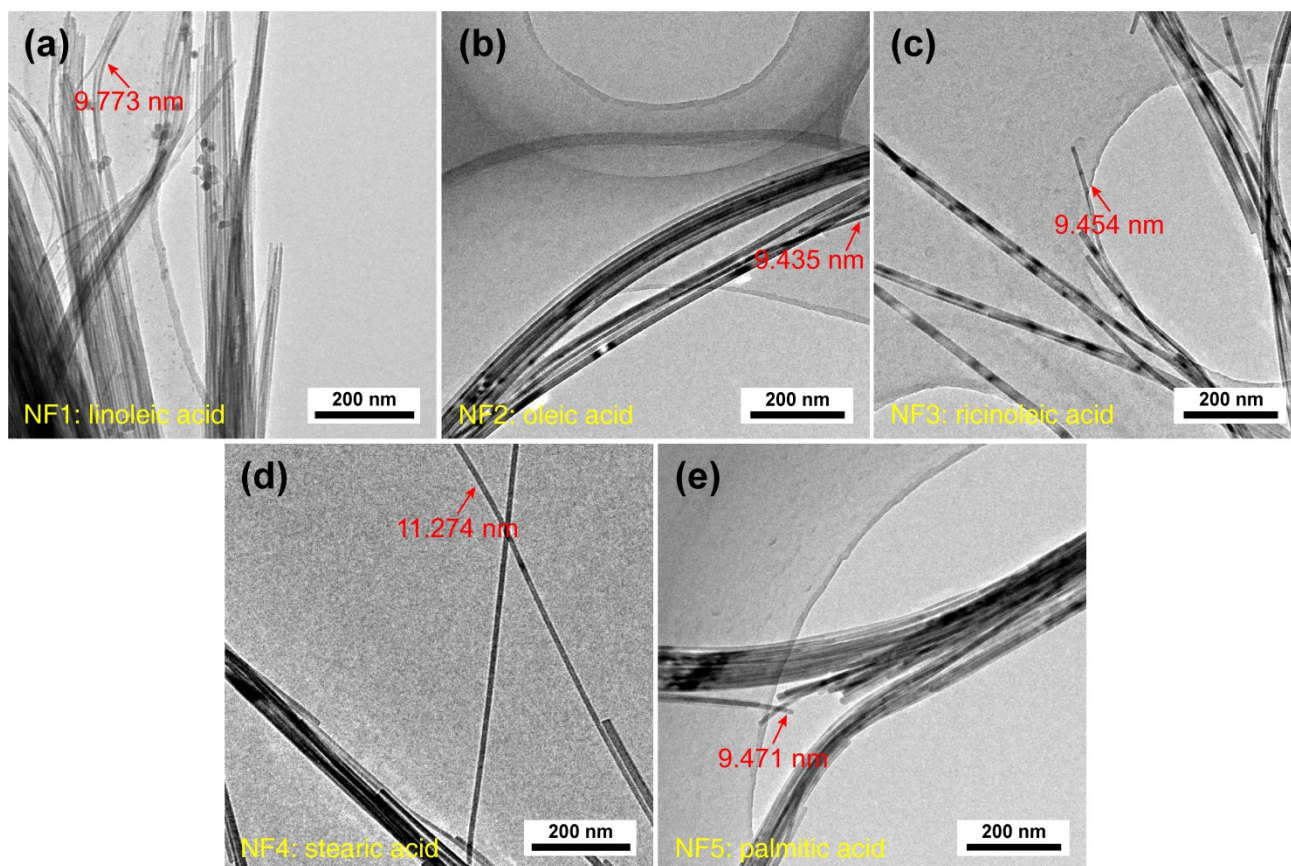


Fig. S1 TEM images of the as-prepared samples synthesized by using different kinds of fatty acids as surfactants.