Supporting Information

Synthesis and characterization of sintered Sr/Fe-modified hydroxyapatite bioceramics for bone tissue engineering applications

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Table S1. The concentration of different chemical reagents used in the preparation of various HAp bioceramics. (M^* = Ca + Sr + Fe).

Sample	**Molar concentrations**				**M^*/P**	**Sr/M^* (%)**	**Fe/M^* (%)**
	$Ca(NO_3)_2$	**$(NH_4)_2HPO_4$**	**$Sr(NO_3)_2$**	**$FeCl_3$**			
HAp	1.00	0.60	-	-	1.667	-	-
Sr10: HAp	0.90	0.60	0.10	-	1.667	19.55	-
Sr7.5/Fe2.5: HAp	0.90	0.60	0.075	0.025	1.667	14.91	3.17
Sr5/Fe5: HAp	0.90	0.60	0.05	0.05	1.667	10.13	6.45
Sr2.5/Fe7.5: HAp	0.90	0.60	0.025	0.075	1.667	5.15	9.87
Fe10: HAp	0.90	0.60	-	0.10	1.667	-	13.41

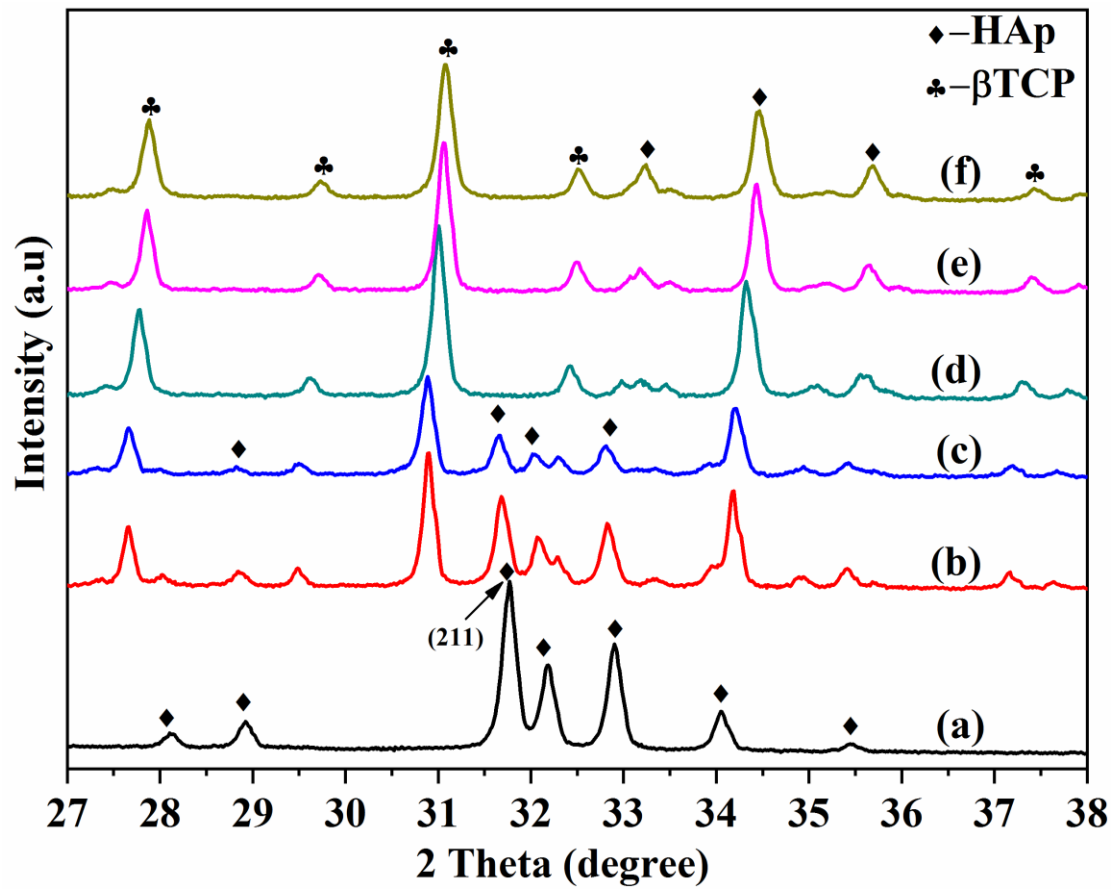

Figure S1. XRD peak pattern of various HAp bioceramics. (a) pristine HAp, (b) Sr10:HAp, (c) Sr7.5/Fe2.5:HAp, (d) Sr5/Fe5:HAp, (e) Sr2.5/Fe7.5:HAp, and (f) Fe10:HAp

The peaks shift, peaks broadening and variation in intensity of peak at (211) plan, indicating the substitution effect in HAp lattice.

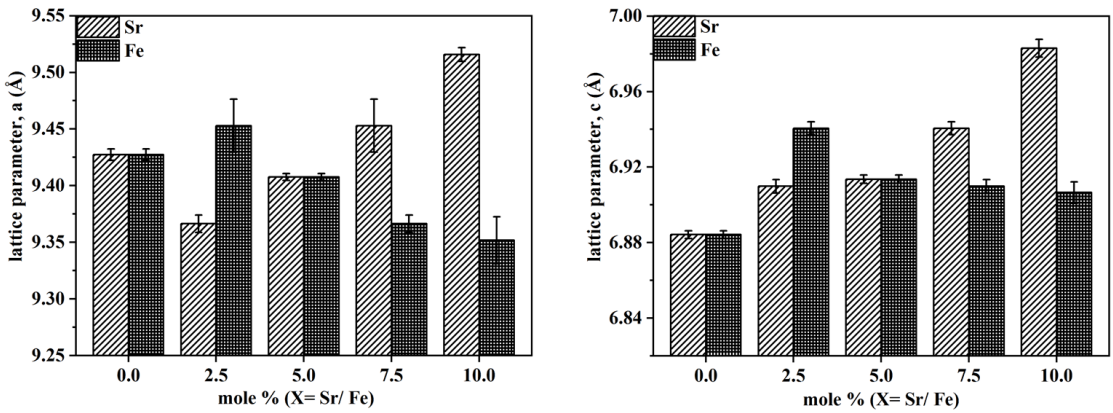

Figure S2. Dependency of the lattice parameters (a and c) on mole % (X= Sr or Fe).

The lattice parameters along both a– and c–axis tend to increase with the rise of

Sr content and *vice versa* for Fe ion concentration in the host lattice.

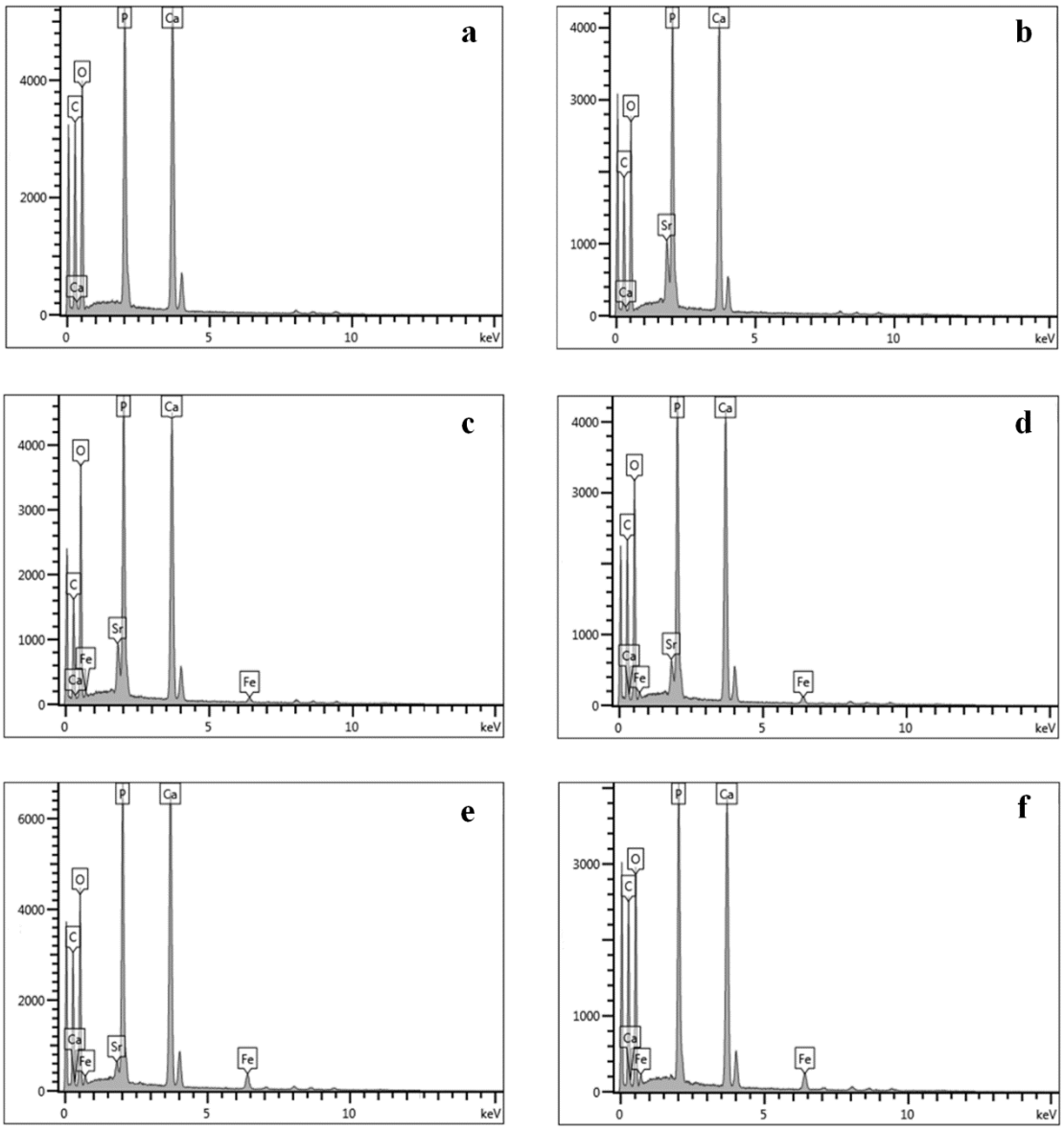

Figure S3. EDX spectra for various HAp bioceramics under investigation, (a) pristine HAp, (b) Sr10:HAp, (c) Sr7.5/Fe2.5:HAp, (d) Sr5/Fe5:HAp, (e) Sr2.5/Fe7.5:HAp, and (f) Fe10:HAp.

The EDX spectra for investigated HAp bioceramics, for example, Sr5/Fe5:HAp group specified that concentration of Sr and Fe was about 2.10 mole% and 1.42 mole% respectively, representing each substituent (i.e. Sr or Fe) exchange ratio with Ca was smaller with respect to the theoretical value of 5 mole%.

Table S2. Elemental composition obtained from the EDX spectra for investigated HAp bioceramics.

Sample	Ca	Sr	Fe	P	Ca/ P
HAp	17.20	0.00	0.00	10.2	1.69
Sr10: HAp	17.35	4.26	0.00	11.21	1.55
Sr7.5/Fe2.5: HAp	17.52	3.59	0.93	11.91	1.47
Sr5/Fe5: HAp	16.18	2.10	1.42	10.53	1.54
Sr2.5/Fe7.5:HAp	17.69	1.25	3.10	11.28	1.57
Fe10:HAp	15.99	0.00	3.19	10.42	1.58

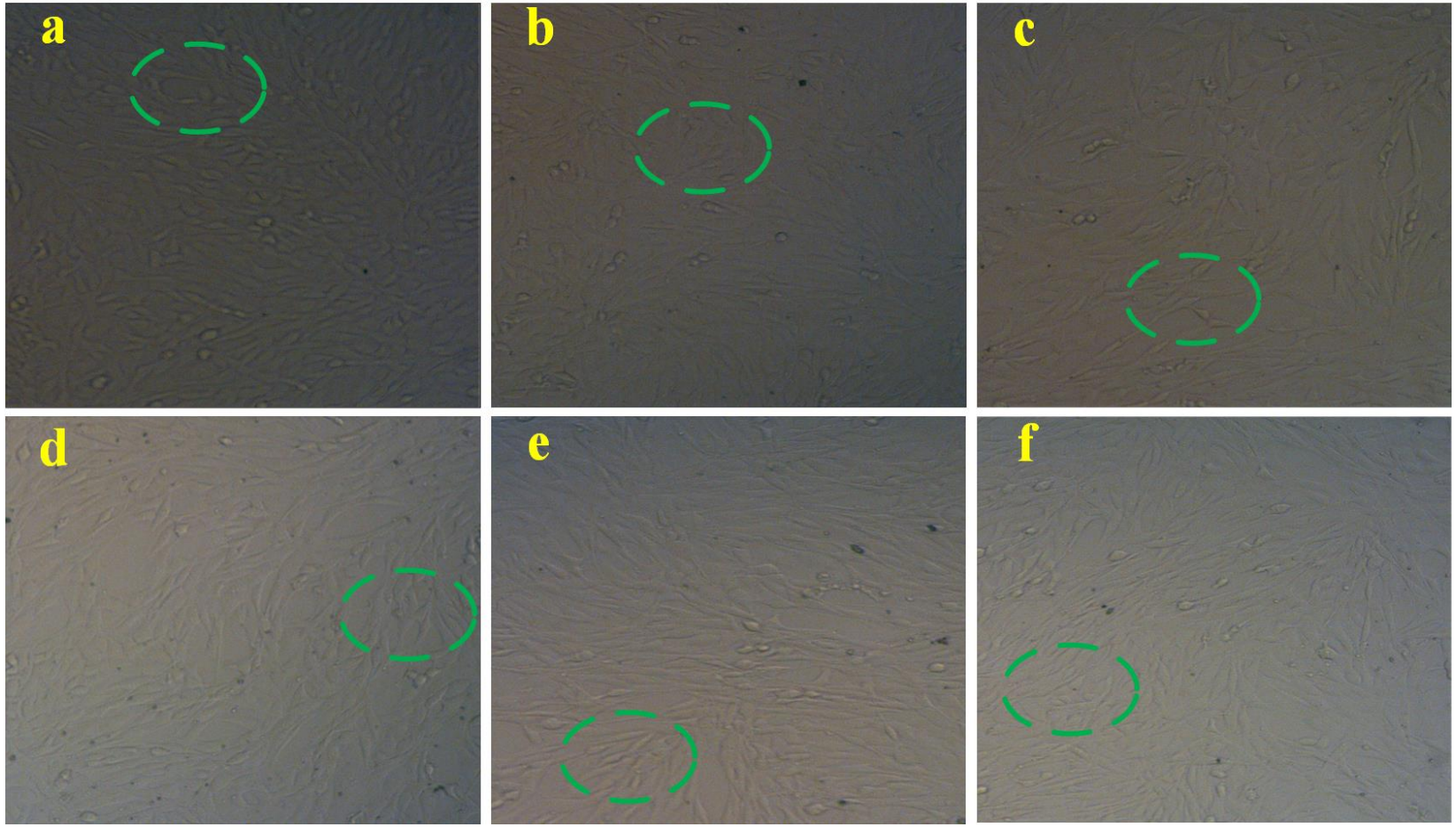

Figure S4. The phase contrast microscopy images (scale bar 50 μm) of cultured hMSCs on investigated HAp bioceramics at day 3, (a) pristine HAp, (b) Sr10:HAp, (c) Sr7.5/Fe2.5:HAp, (d) Sr5/Fe5:HAp, (e) Sr2.5/Fe7.5:HAp, and (f) Fe10:HAp, groups respectively.