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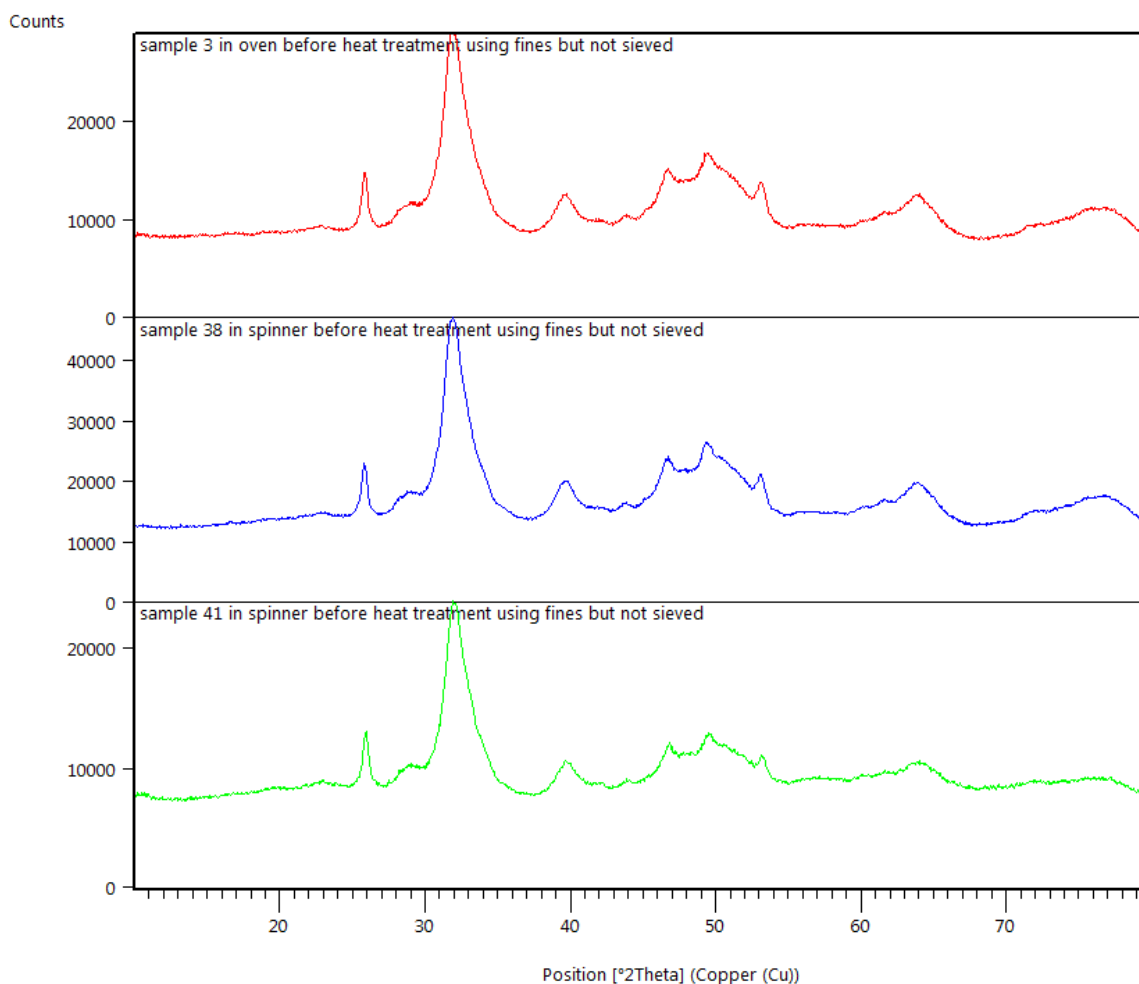
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Physiological Silicon Incorporation into Bone Mineral Requires

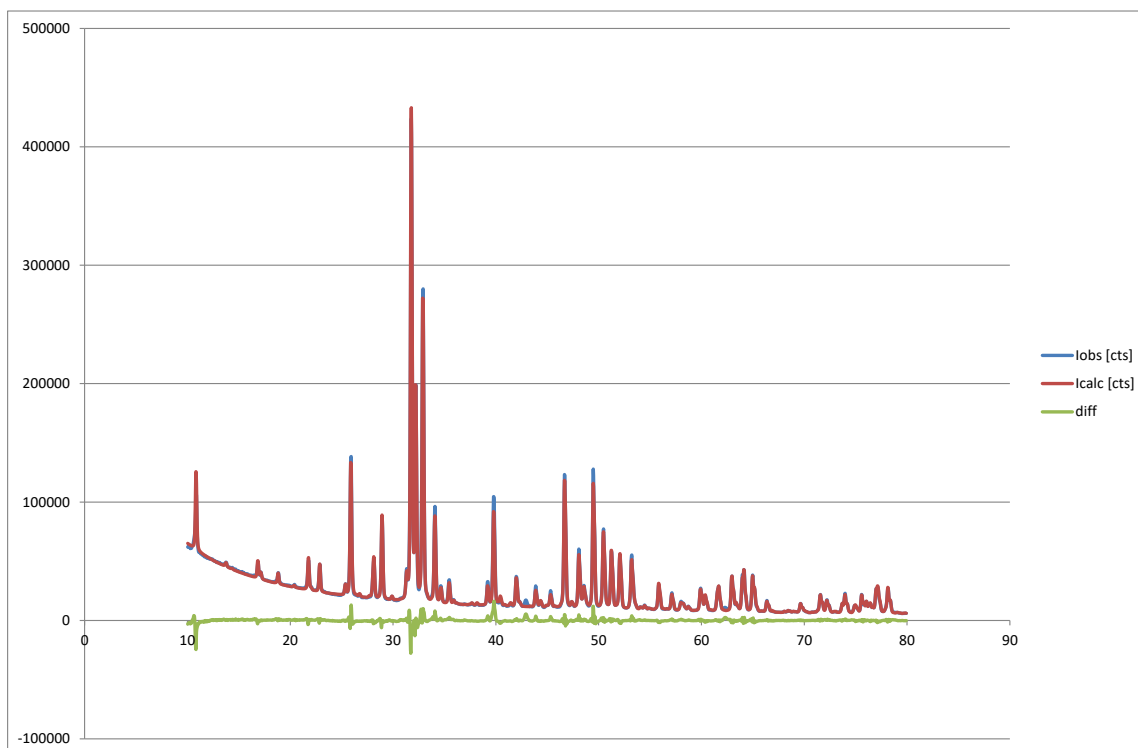
Orthosilicic Acid Metabolism to SiO_4^{4-}

Helen F. Chappell*, Ravin Jugdaohsingh and Jonathan J. Powell

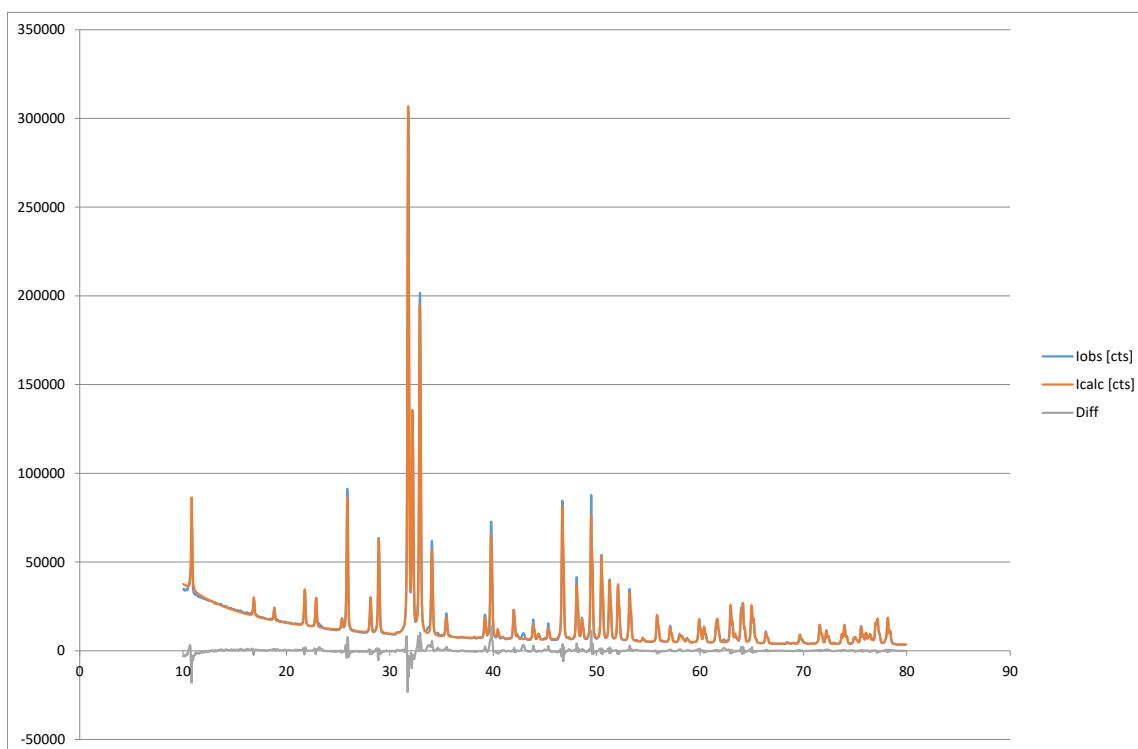
Supplementary Figure S1. XRD scans at room temperature of the low (sample 3) and high (sample 41) silicon -containing bones. Little difference can be seen between the two samples. Sample 38 is also a low silicon-containing bone. These femur bone samples were from female Sprague Dawley rats of 26-28 weeks old (see ref 7 for details on the collection of samples 38 and 41 and ref 46 for details on sample 3). Treatment of the bone samples prior to XRD analysis was as described in ref 12.



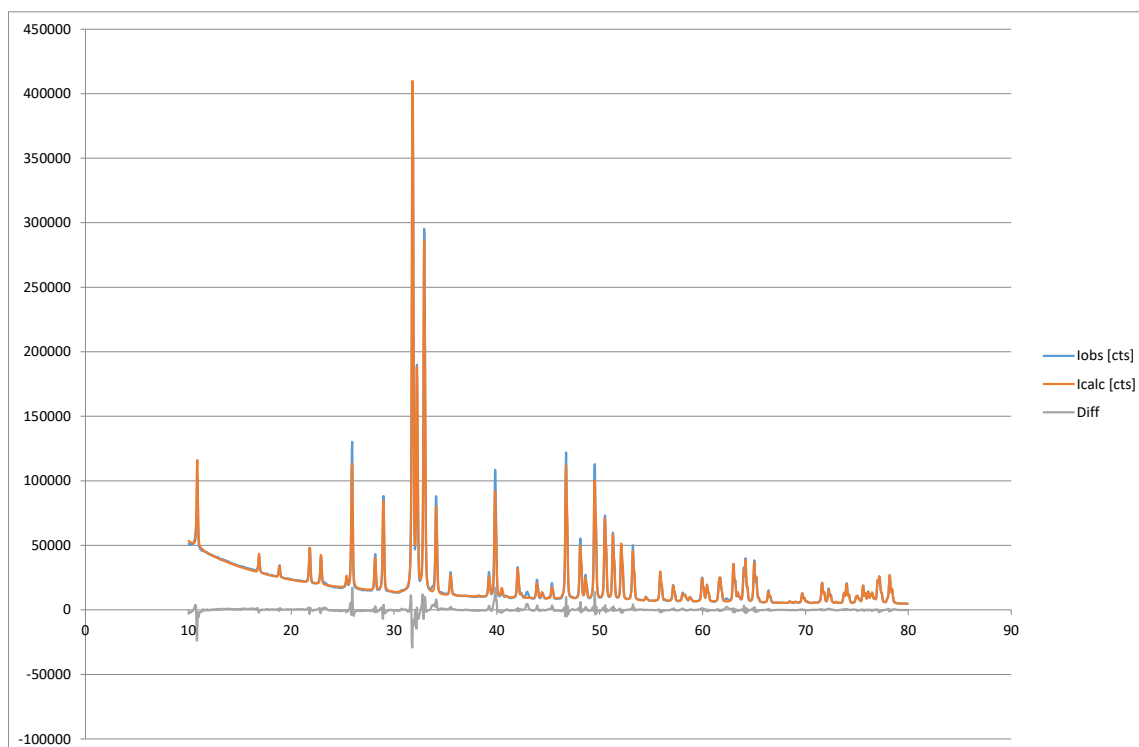
Supplementary Figure S2. XRD scans at room temperature with Rietveld refinements, of the two low silicon containing bones (samples 3 and 38) and the high silicon containing bone (sample 41) following heat treatment at 800°C.



Sample 3.



Sample 38.



Sample 41

Calculated Structure .cif files.

Interstitial Neutral OSA

#

CIF Neutral Interstitial OSA in HA
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_symmetry_space_group_name_H-M 'P1'

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SiO₄H for PO₄

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SiO₄ for PO₄ with OH removal

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# CIF SiO4 substituted for PO4, with OH removal for charge compensation.
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H4	0.007740179922156	0.502137977810079	0.970543689079053	0.0100	1.0000
H5	0.996893383249562	1.000552051662183	0.214936506383933	0.0100	1.0000
H6	0.992222548045600	1.000024140660471	0.713448621720527	0.0100	1.0000
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O4	0.363479092089434	0.637135961664692	0.527123886779348	0.0100	1.0000
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O7	0.749812164111464	0.538152129239621	0.041792215698288	0.0100	1.0000
O8	0.791536153517826	0.518689520900833	0.554508979216165	0.0100	1.0000
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O31	0.257250338227945	0.958801388450849	0.464466107578794	0.0100	1.0000
O32	0.257515814263620	0.959343968037919	0.964870504634934	0.0100	1.0000
O33	0.084436431197940	0.174773783878594	0.467505612102677	0.0100	1.0000
O34	0.086123334856263	0.175575200075033	0.966456111441562	0.0100	1.0000
O35	0.092456974566038	0.673697967372439	0.467078784330144	0.0100	1.0000
O36	0.095076456623181	0.676428274116076	0.968185633024223	0.0100	1.0000
O37	0.338824565743464	0.127815483465437	0.214124316479437	0.0100	1.0000

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O38 0.336644917750031 0.126195841516390 0.714718347895340 0.0100 1.0000
O39 0.337801738028872 0.627468248974108 0.211850165908841 0.0100 1.0000
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O42 0.733742874045495 0.046226499537950 0.716575141527469 0.0100 1.0000
O43 0.734966803647740 0.543863756003644 0.219838907829673 0.0100 1.0000
O44 0.751414876903801 0.549446553813065 0.728883135438192 0.0100 1.0000
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O48 0.916170065672892 0.824634404456719 0.715344169102540 0.0100 1.0000
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O50 0.323357744061573 0.238778077711832 0.627826141286334 0.0100 1.0000
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O98 -0.003626679411477 0.000416399303602 0.895261298708525 0.0100 1.0000
O99 0.003241542977399 0.500366238236217 0.384990768750695 0.0100 1.0000
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Si1 0.651884788769109 0.510722039900588 0.630180083107653 0.0100 1.0000
P1 0.397524709043654 0.184304169307332 0.126614760182618 0.0100 1.0000
P2 0.392352947003185 0.181906467216059 0.626641235235664 0.0100 1.0000
P3 0.401474716459452 0.685348659340705 0.125835345102796 0.0100 1.0000
P4 0.388106073766483 0.679480348655030 0.624659419344189 0.0100 1.0000
P5 0.629228160690334 0.015049098113792 0.126512243834762 0.0100 1.0000
P6 0.628235271245736 0.015518453930064 0.626104827408857 0.0100 1.0000
P7 0.633794286290117 0.515336850705798 0.127633137741987 0.0100 1.0000
P8 0.969155904129627 0.300588535444674 0.122612113258599 0.0100 1.0000
P9 0.970597687720057 0.308773093912160 0.622086716938897 0.0100 1.0000
P10 0.969808168786849 0.800573303528720 0.124562391180390 0.0100 1.0000
P11 0.971166632166175 0.801252534038264 0.623177817385686 0.0100 1.0000
P12 0.592928532571054 0.311452241721259 0.372118742861530 0.0100 1.0000
P13 0.599856324312415 0.314221639323295 0.874931846281461 0.0100 1.0000
P14 0.601686556721762 0.816378877825500 0.374400554365230 0.0100 1.0000
P15 0.602664127934231 0.815493762695433 0.874677897241553 0.0100 1.0000
P16 0.372812047971084 0.485787130662214 0.373524610660195 0.0100 1.0000
P17 0.374068363068239 0.485566249882806 0.875371313921428 0.0100 1.0000
P18 0.366863369208538 0.984058991184030 0.375587518790098 0.0100 1.0000
P19 0.365943360591440 0.984261533382194 0.875598860726448 0.0100 1.0000
P20 0.028234376062786 0.199946588748405 0.377376900805379 0.0100 1.0000
P21 0.027257877717177 0.200245534906042 0.876990880177278 0.0100 1.0000
P22 0.029507333818865 0.698895129326801 0.379962879356217 0.0100 1.0000
P23 0.036581306461095 0.703726360686370 0.881221814995017 0.0100 1.0000
Ca1 0.255519178133979 0.500754400346871 0.123245694572339 0.0100 1.0000
Ca2 0.295553160084290 0.495771847942013 0.622259511739877 0.0100 1.0000
Ca3 0.247860498954200 0.999419654781389 0.125006794575721 0.0100 1.0000
Ca4 0.244056965365376 0.997796776420275 0.625022458532986 0.0100 1.0000
Ca5 -0.000797978617801 0.126725373188976 0.126019667933043 0.0100 1.0000
Ca6 -0.004041937614656 0.127925107062686 0.626525640984537 0.0100 1.0000
Ca7 0.002630698816069 0.626029358257809 0.127023080088136 0.0100 1.0000
Ca8 0.008618550490707 0.632173934596646 0.630756426676780 0.0100 1.0000
Ca9 0.748907606834117 0.375133180588146 0.126023065608885 0.0100 1.0000
Ca10 0.724182430789321 0.371067466215993 0.623017847819421 0.0100 1.0000
Ca11 0.746408138743063 0.874912513077357 0.126381323177389 0.0100 1.0000
Ca12 0.742088437623015 0.871215117072497 0.628273299756467 0.0100 1.0000
Ca13 0.747717271532390 0.002298768005286 0.375556752026988 0.0100 1.0000
Ca14 0.746675942194844 0.001376944484015 0.875748962996885 0.0100 1.0000
Ca15 0.750582250864355 0.497875160726160 0.381827775775802 0.0100 1.0000
Ca16 0.753998884339456 0.499330175711840 0.879087095173493 0.0100 1.0000
Ca17 1.002865301435333 0.375285374767845 0.371342213702374 0.0100 1.0000
Ca18 1.001847907671331 0.378433755355329 0.872933593929612 0.0100 1.0000
Ca19 0.996347148733320 0.875237429417630 0.374214017614808 0.0100 1.0000
Ca20 0.994877469722125 0.874167034419261 0.875223067749617 0.0100 1.0000
Ca21 0.246384890724377 0.123822257939731 0.373891576993629 0.0100 1.0000
Ca22 0.247066891290452 0.125340144665725 0.874691955164661 0.0100 1.0000
Ca23 0.255111971693222 0.627053428041339 0.371438917553633 0.0100 1.0000
Ca24 0.251026591420080 0.624868557259745 0.872490739817406 0.0100 1.0000

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Ca25	0.336713793694314	0.330999937080192	0.001527045835247	0.0100	1.0000
Ca26	0.338562320151963	0.330516927115759	0.502061712038291	0.0100	1.0000
Ca27	0.340411429060090	0.832898380922190	0.001802567130882	0.0100	1.0000
Ca28	0.337924434779581	0.831673874663136	0.499864242842877	0.0100	1.0000
Ca29	0.667938614684231	0.164789685864079	0.250056989362265	0.0100	1.0000
Ca30	0.660796396508096	0.162322544094306	0.751078390697553	0.0100	1.0000
Ca31	0.675125138151587	0.665757049264729	0.251018994854560	0.0100	1.0000
Ca32	0.688832065460285	0.661271077895735	0.750303327633563	0.0100	1.0000
Ca33	0.659585886323089	0.166902696408342	0.498837991721723	0.0100	1.0000
Ca34	0.660420549520513	0.167539607199528	0.998674811031537	0.0100	1.0000
Ca35	0.658489233660556	0.670950380455096	0.499628801007909	0.0100	1.0000
Ca36	0.662614561309233	0.669069989031759	0.999043689732753	0.0100	1.0000
Ca37	0.330355019800567	0.336270352816384	0.248966663306276	0.0100	1.0000
Ca38	0.328270338746226	0.334209101481056	0.749859523782220	0.0100	1.0000
Ca39	0.323441823524603	0.833251329160935	0.249458638312869	0.0100	1.0000
Ca40	0.326936909307275	0.833800115259384	0.749928458182609	0.0100	1.0000