Supporting Information

Bottom-up Self-assembled Hydrogel-mineral Composites Regenerate Rabbit Ulna Defect without Added Growth Factors

Akhil Patel[a], Samer H. Zaky[b], Hongshuai Li[c], Karen Schoedel[d], Alejandro J. Almarza[b,e,f], Charles Sfeir[b,e,f], Vinayak Sant[a], Shilpa Sant*[a, e, f, g].

a. Department of Pharmaceutical Sciences, School of Pharmacy, University of Pittsburgh, Pittsburgh, PA 15261.

b. Center for Craniofacial Regeneration, School of Dental Medicine, University of Pittsburgh, Pittsburgh, PA 15261.

c. Musculoskeletal Growth & Regeneration Laboratory, Department of Orthopaedic Surgery, School of Medicine, University of Pittsburgh, Pittsburgh, PA 15261.

d. Department of Pathology, School of Medicine, University of Pittsburgh, Pittsburgh, PA 15261.

e. Department of Bioengineering, Swanson School of Engineering, University of Pittsburgh, Pittsburgh, PA 15219.

f. McGowan Institute for Regenerative Medicine, Pittsburgh, PA 15260.

g. UPMC Hillman Cancer Center, University of Pittsburgh, Pittsburgh, PA 15260.

*** Corresponding author:**

Shilpa Sant, PhD; shs149@pitt.edu

700 Technology Drive, Room 4307, Pittsburgh Technology Center, Pittsburgh PA 15219.

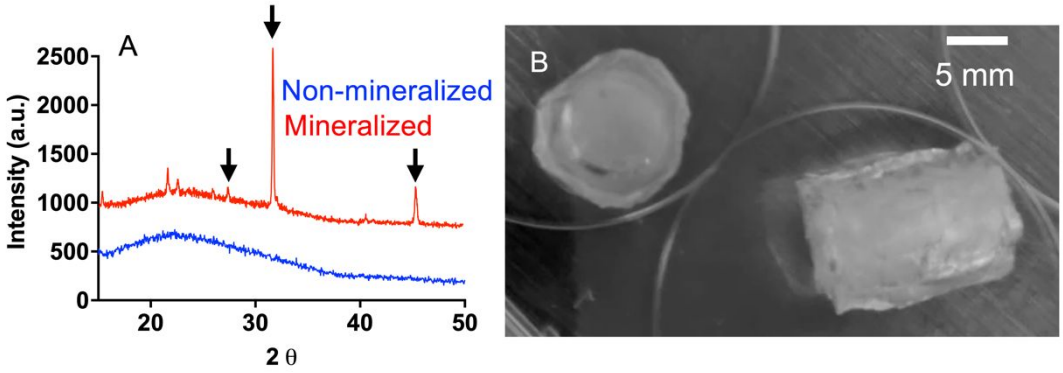


Figure S1:

A shows X-ray diffraction spectrum of non-mineralized and mineralized RegenMatrix. **B** shows two cylindrical RegenMatrix inside separate PDMS sleeves set in different orientations. The white core is cylindrical RegenMatrix prior to cell seeding and the shiny and transparent periphery is PDMS mold.

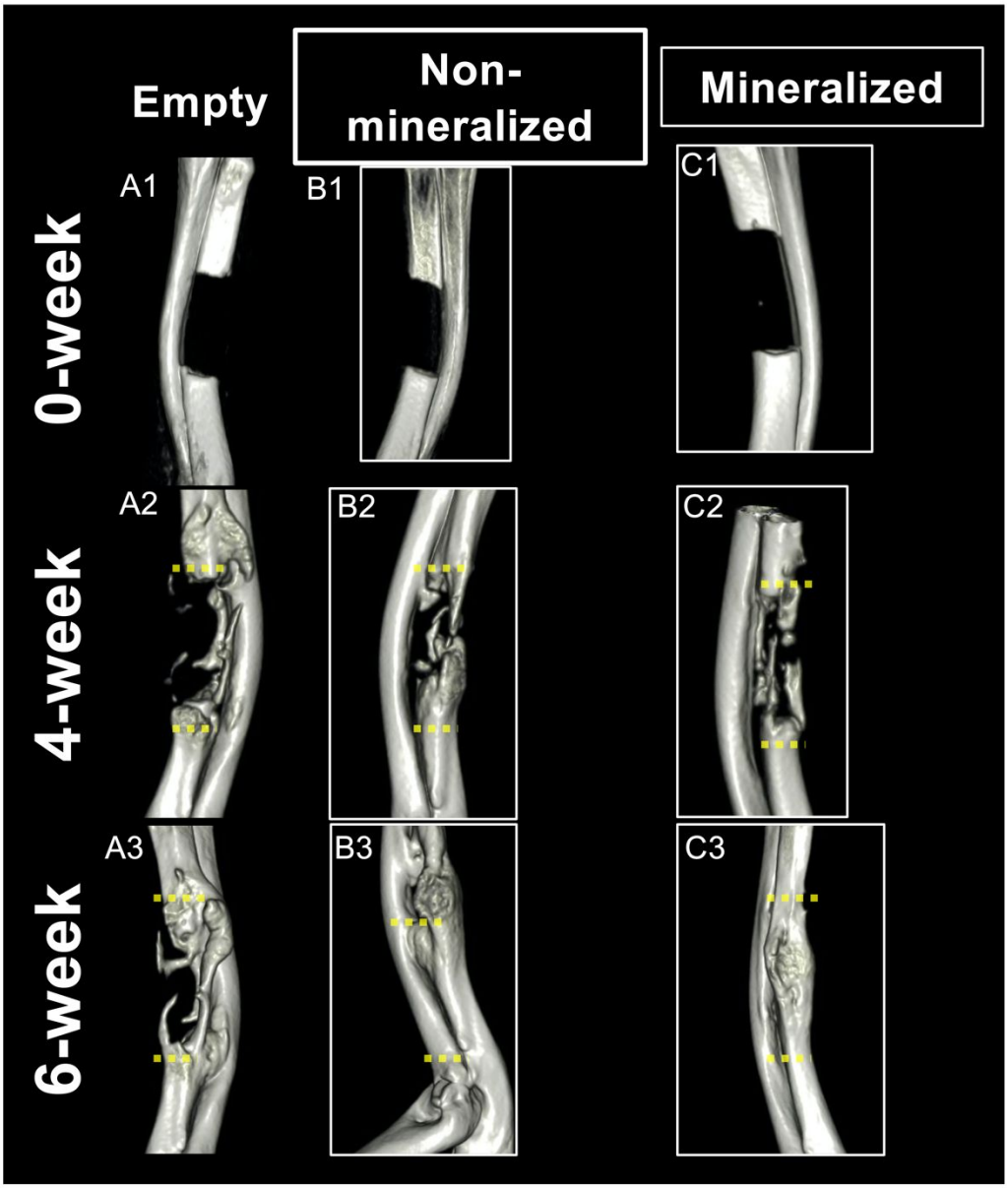


Figure S2:

A1-A3 show live CT images of empty ulna defect from 0-week to 6-week. Likewise, **B1-B3** show live CT images of non-mineralized group and **C1-C3** show live CT images of mineralized group from 0-week to 6-week.

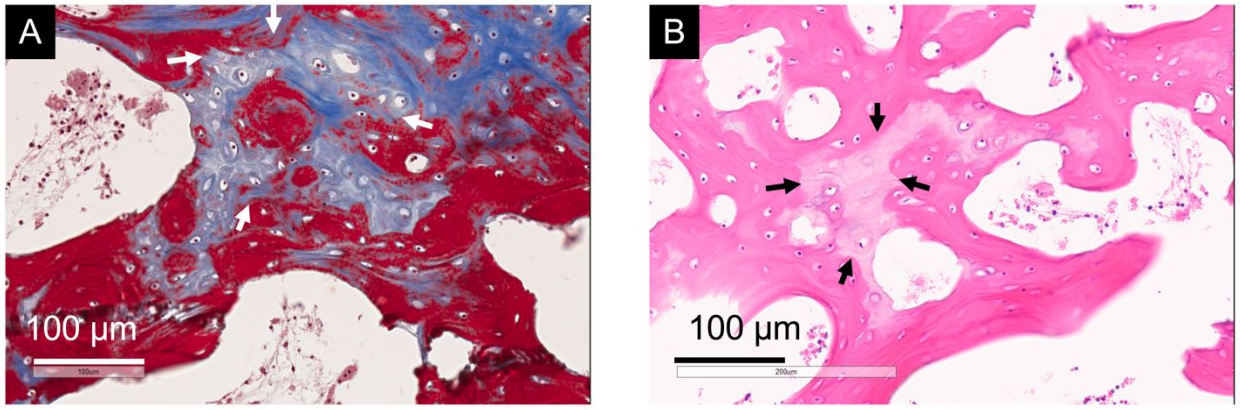
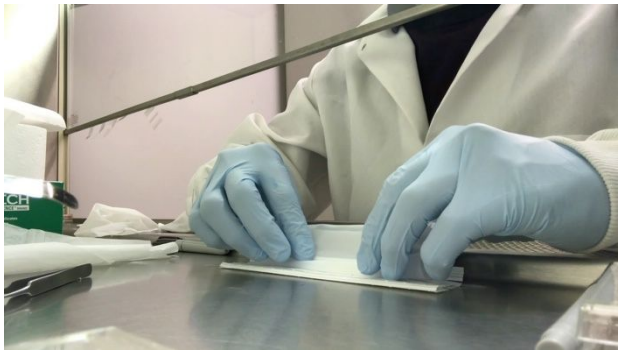


Figure S3:

A shows Masson's trichrome staining of mineralized RegenMatrix, white arrows indicate area showing endochondral ossification. **B** shows H&E staining of mineralized RegenMatrix. black arrows indicate area showing endochondral ossification.



Video S1: Cylindrical scaffold fabrication (*uploaded separately with submission files*)

Video demonstrates an aseptic method to fabricate a cylindrical scaffold from a rectangular scaffold film.