Supplementary Information (SI) for Journal of Materials Chemistry C. This journal is © The Royal Society of Chemistry 2025

## **Supplementary Information**





**Figure S1** (A) The PFM morphology of the CSSA-5.0BTO scaffold and its two-position and threedimensional phase images were represented. (B) Detection of particle size distribution of  $BaTiO_3$ NPs, providing insights into their uniformity.



**Figure S2** Flow identification of BMSCs cells(a); differentiation identification staining for osteogenic, adipogenic, and chondrogenic differentiation of BMSCs cells(b).



Figure S3 HE staining results of vital organs after sampling in SD rats in each group at 12 weeks.