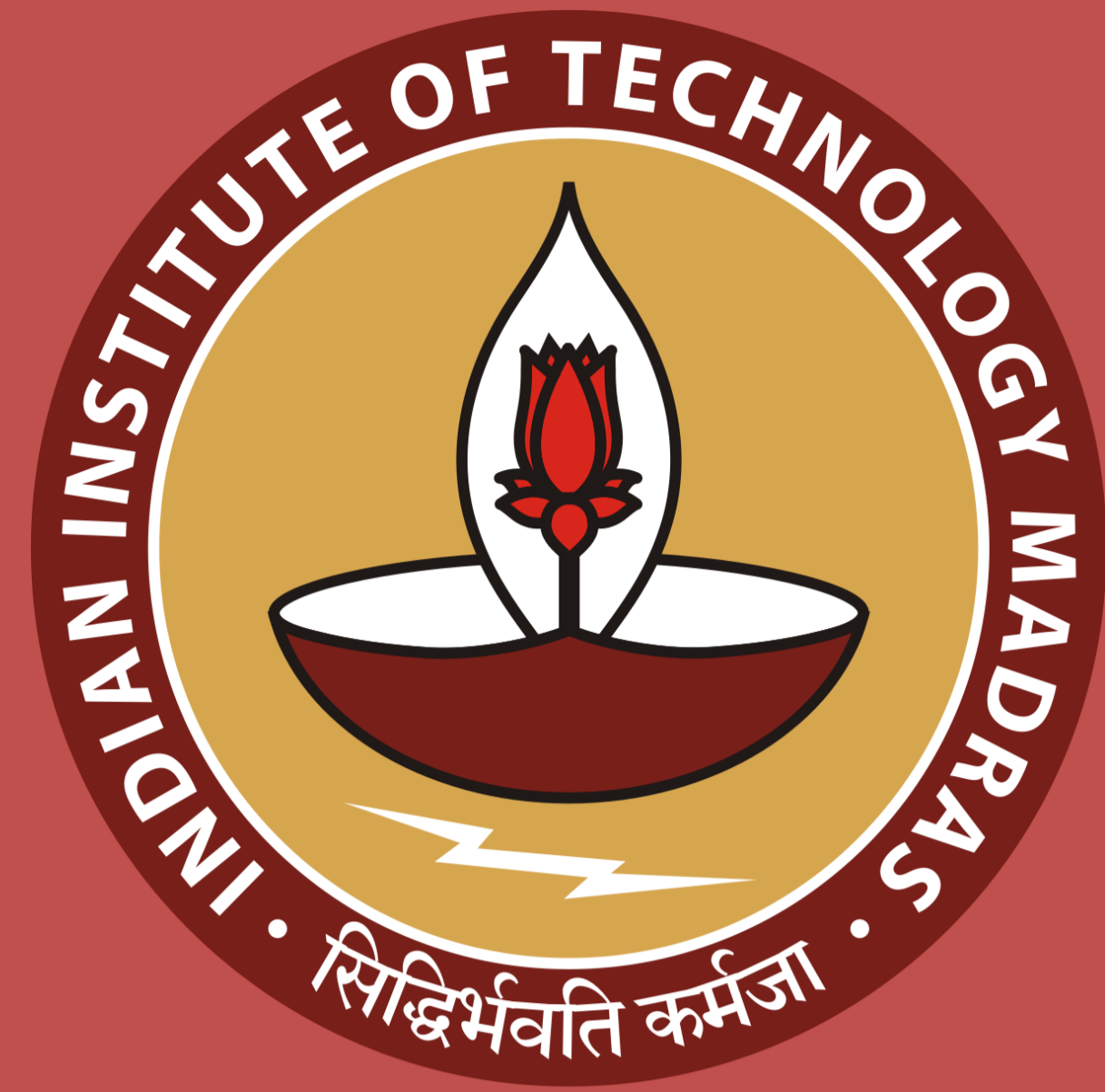


High Internal Phase Pickering Emulsion (HIPE)-Templated Porous Scaffolds Loaded With Polyunsaturated Fatty Acids (PUFA) For Bone Tissue Engineering

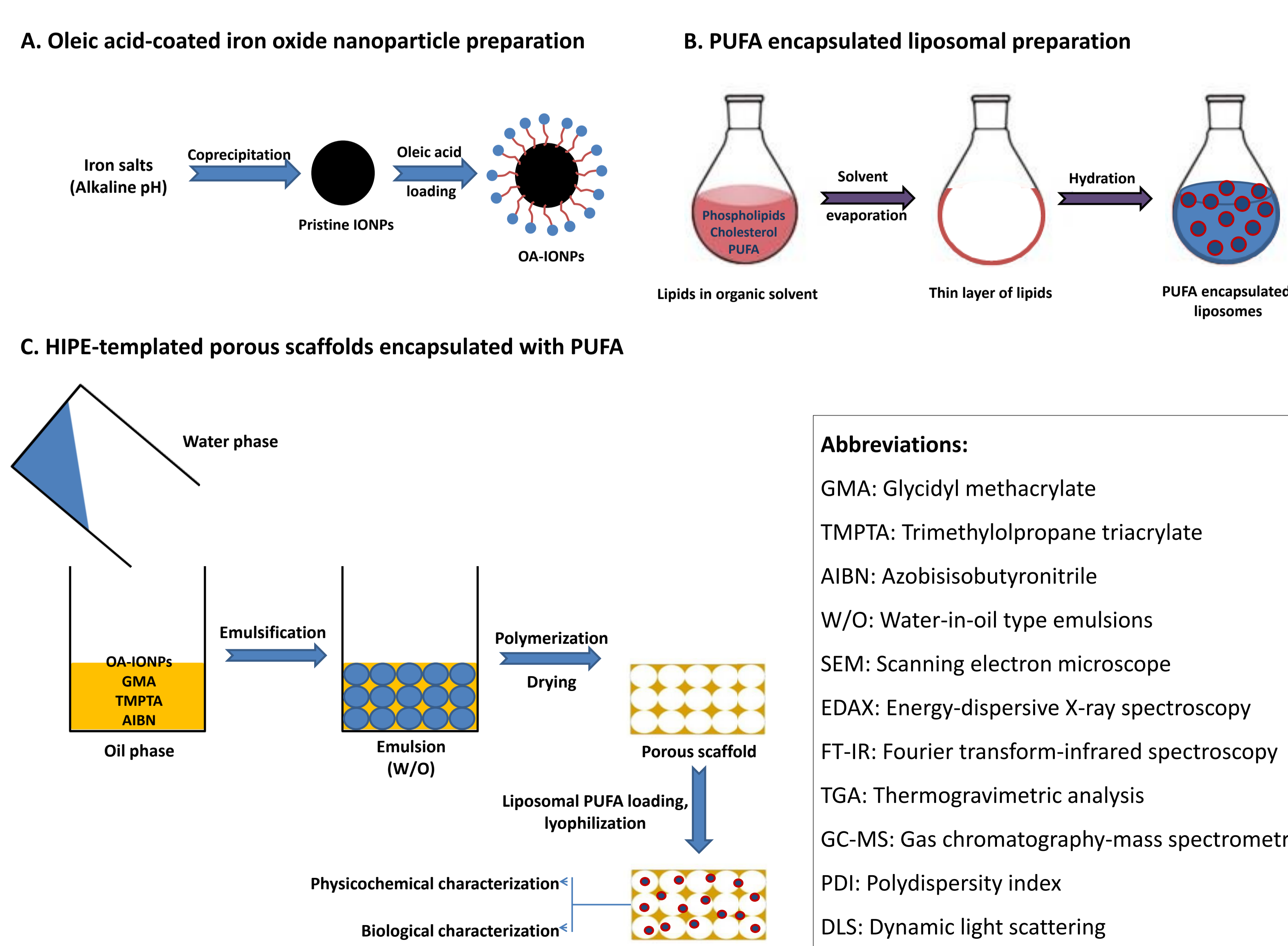


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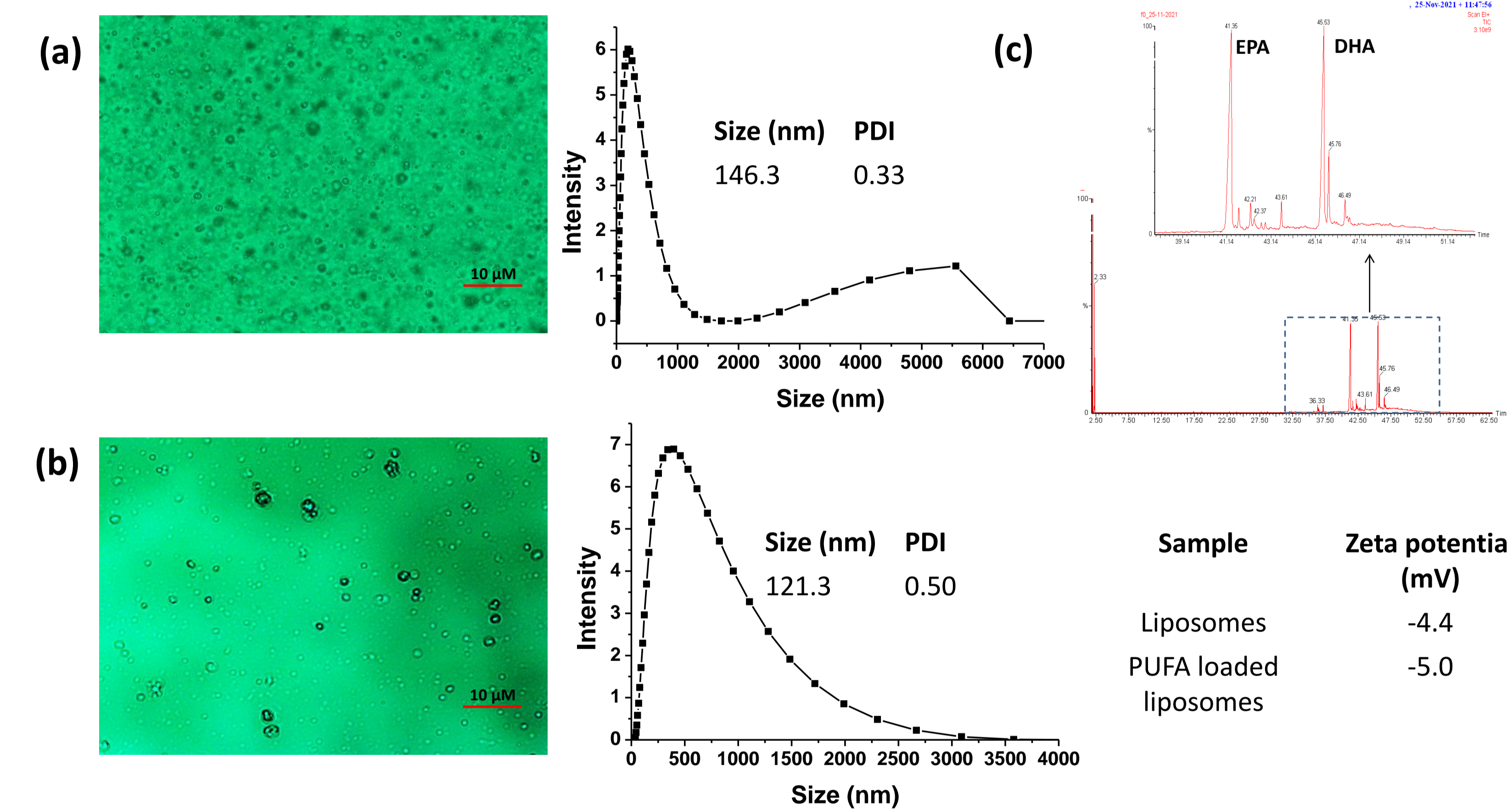
Introduction:

- ❖ High internal phase emulsion polymerization yields highly porous materials.
- ❖ Pickering emulsions mediated by nanoparticles proven to be highly stable than the conventional emulsions.
- ❖ Polyunsaturated fatty acids (PUFA) are known to induce bone regeneration.
- ❖ In the present study, oleic acid coated iron oxide nanoparticles (OA-IONPs) were prepared and used for preparing Pickering emulsions.
- ❖ Acrylate based monomers were used in the oil-phase and polymerized subsequently.
- ❖ Liposomal encapsulated PUFA were loaded into the porous scaffold post fabrication and then lyophilized.
- ❖ This system is evaluated for physicochemical characterization and biological characterization for bone tissue engineering applications.

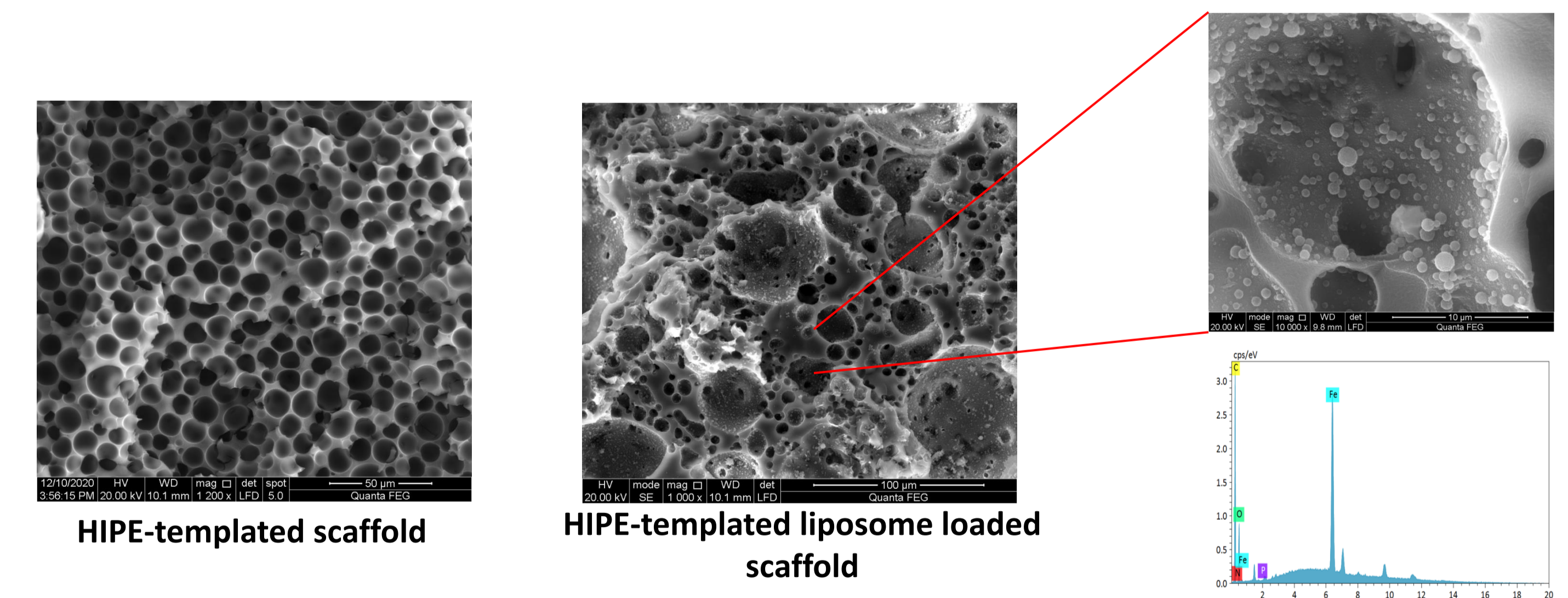
Work plan:



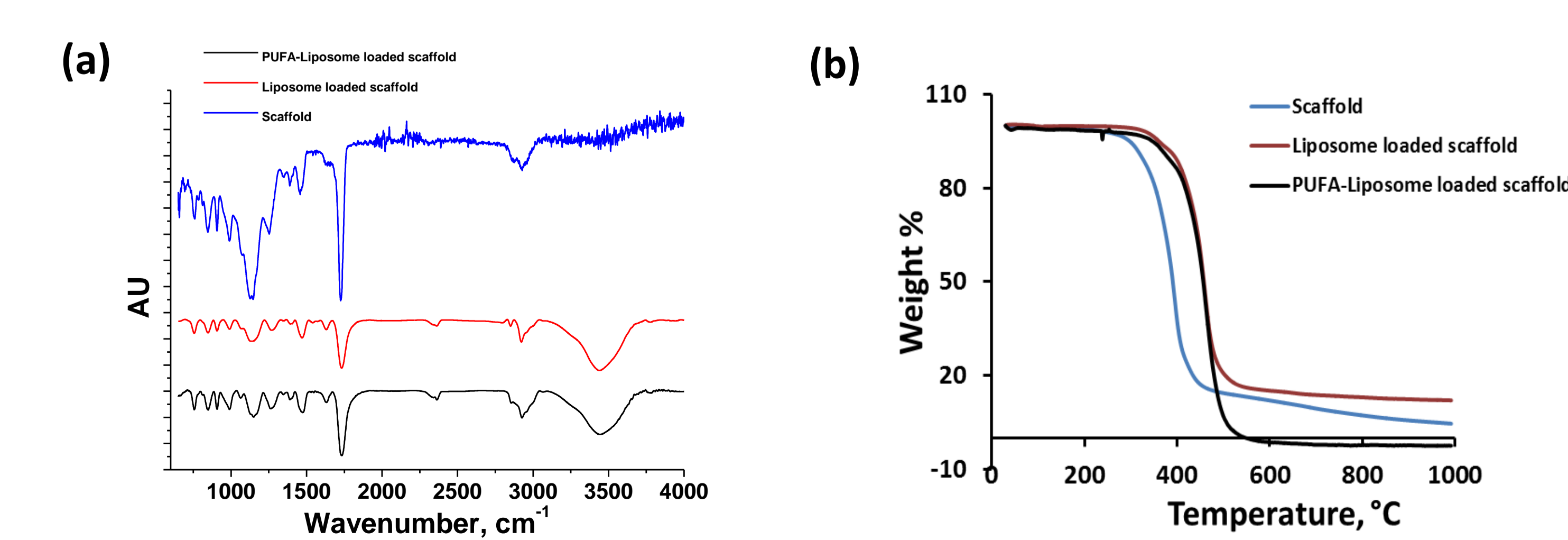
Results:



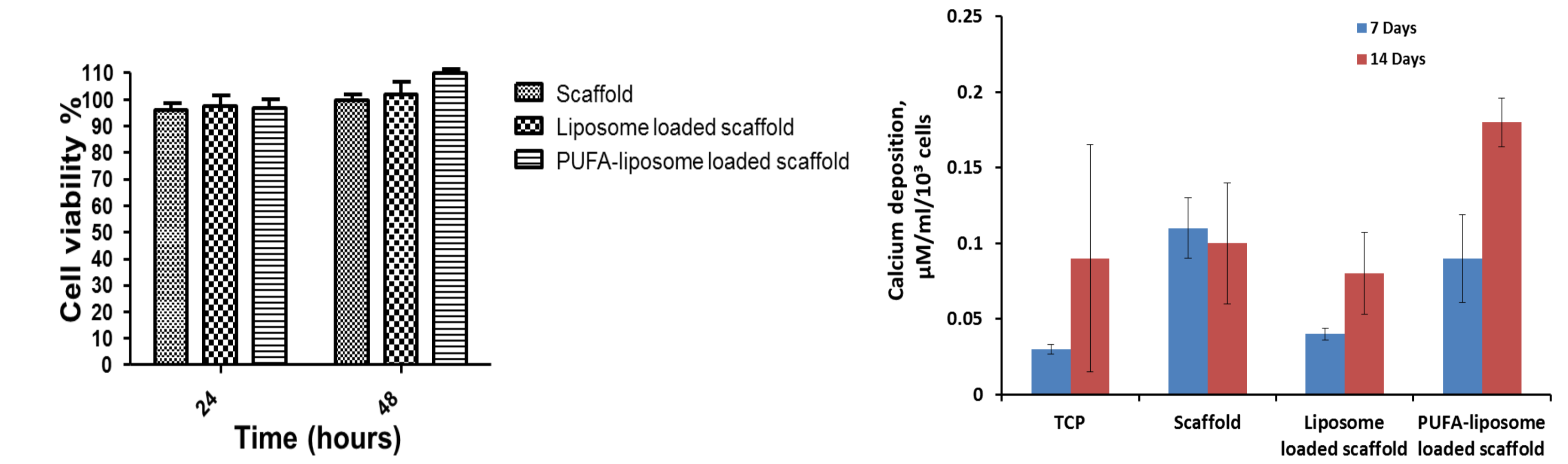
Light microscopy and DLS analysis of (a) liposomes, (b) PUFA-loaded liposomes, and (c) GC-MS analysis of PUFA enriched fish oil used in the study



Morphology study of HIPE-templated scaffold, and PUFA-liposome loaded scaffolds



Physicochemical characterization of scaffolds: (a) FT-IR, and (b) TGA



Conclusions:

- ❖ GC-MS analysis showed that fish oil used for the study is enriched with PUFA containing 80% of PUFA.
- ❖ DLS study showed that prepared liposomes were in nanometer size, however liposomes were polydisperse in nature.
- ❖ Scaffolds prepared using emulsion polymerization technique yielded highly porous scaffolds which is evident by the SEM analysis.
- ❖ SEM and EDAX analysis confirmed successful incorporation of liposomes into the scaffolds.
- ❖ PUFA-liposome loaded scaffolds were further characterized for chemical nature using FT-IR and thermal behavior using TGA analysis.
- ❖ Cell viability study conducted on the scaffolds up to 48 h showed that scaffolds were highly cytocompatible.
- ❖ Alizarin red assay showed that there was significant calcium deposition in the PUFA-liposome loaded scaffolds on 7th and 14th days.

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