

Introduction

Hydroxyapatite/chitosan (HA/CS) composite is being widely studied as bone tissue engineering materials due to its excellent biological characteristics. Lithium (Li), with an osteogenic effect, is expected to be an additive to bone substitutes to enhance the osteoinduction.

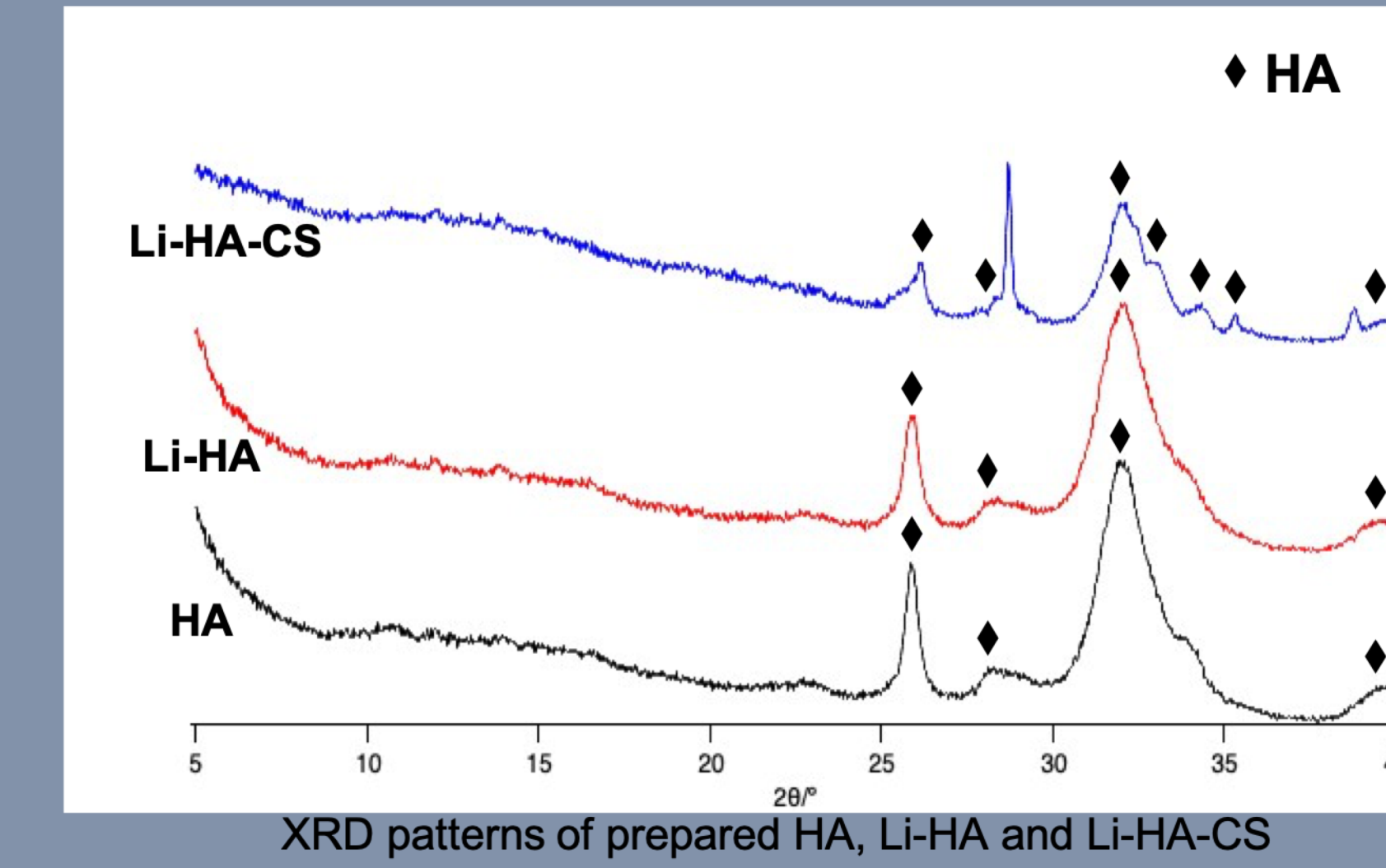
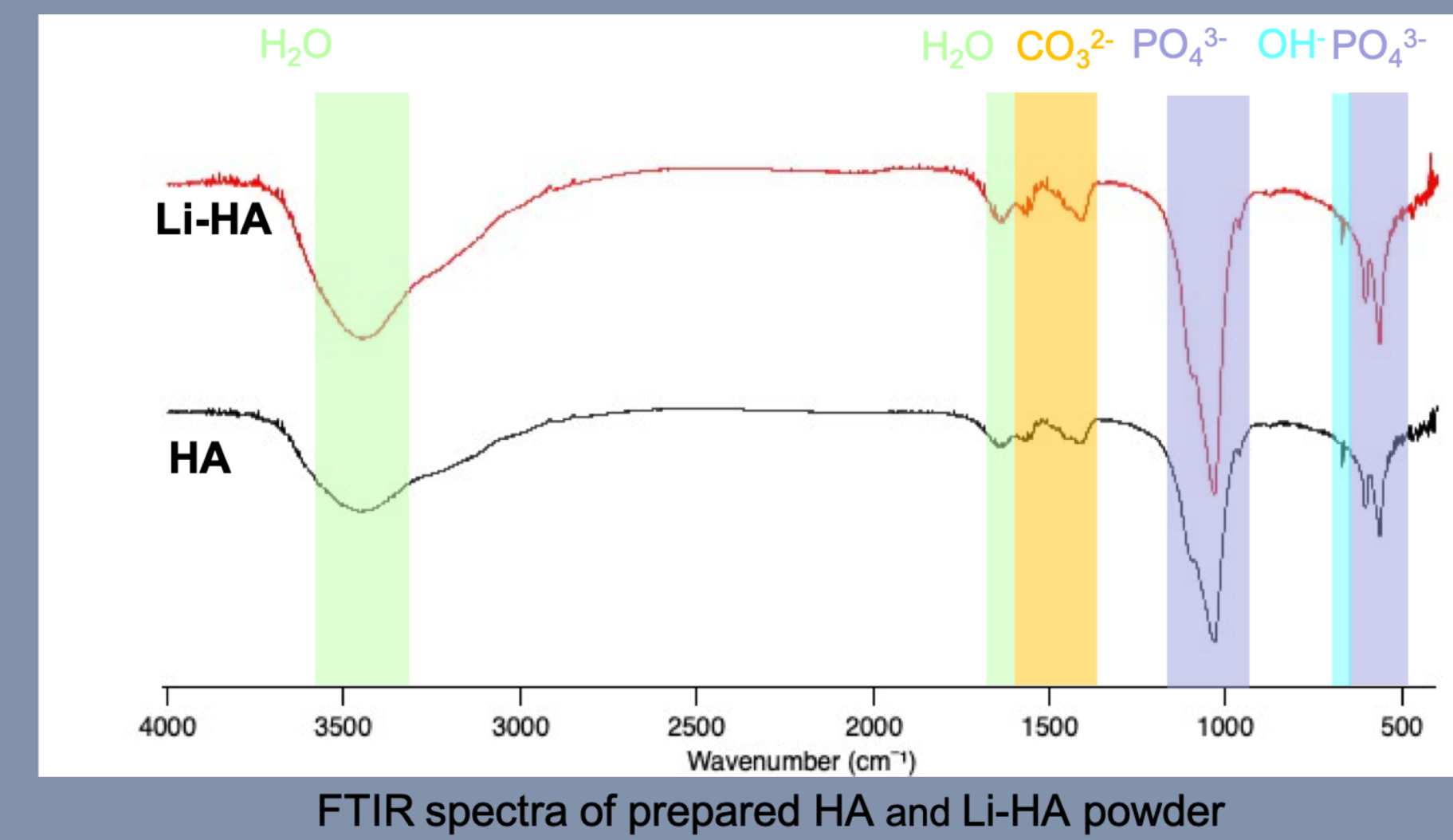
Conclusion

Doping Li into HA lyophilized with CS is a feasible modification method and Li-HA-CS might be a suitable material for bone tissue engineering.

Method

1. Preparation. Li-HA and HA powder were prepared through chemical precipitation. Li-HA or HA was then dispersed into CS and the final scaffolds were obtained by lyophilization.
2. Characterization. The physicochemical properties were characterized by FTIR, XRD and SEM. Besides, a cell experiment was applied and the proliferation was tested.

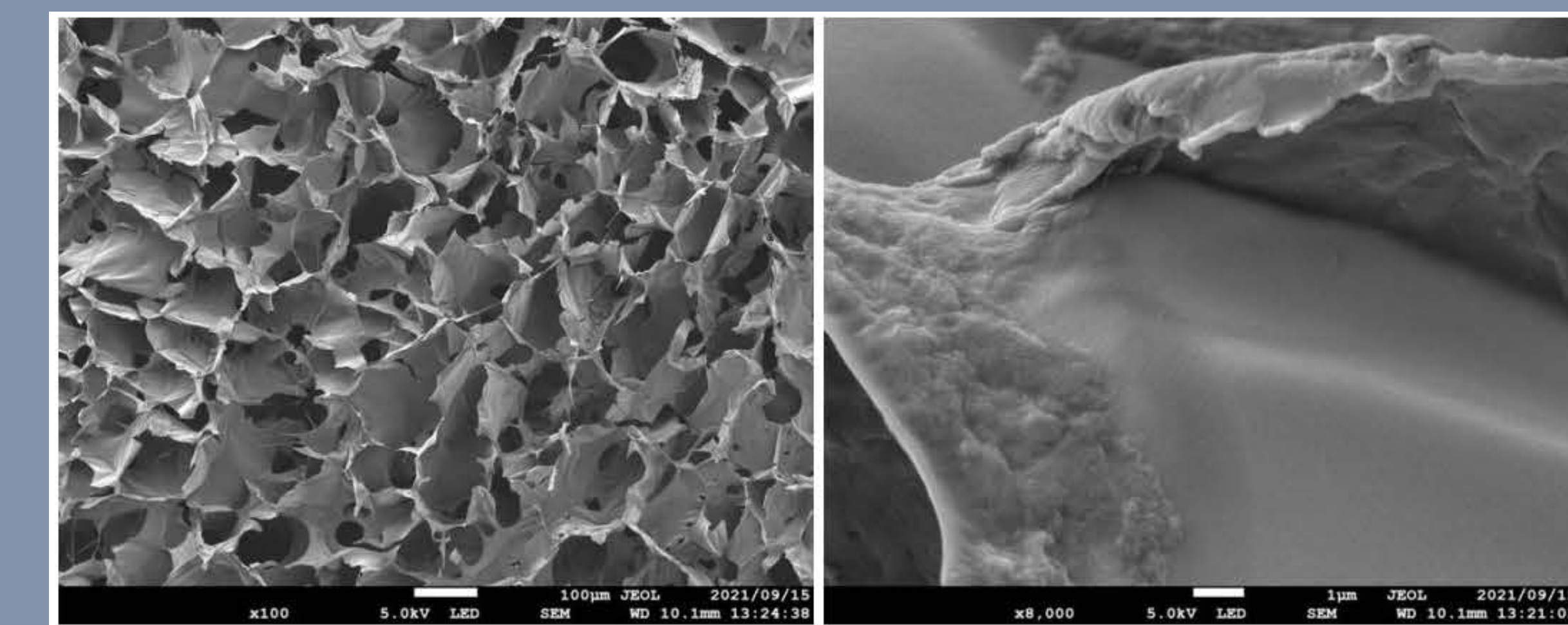
Results



The SEM micrographs at two magnifications show the typical morphology of freeze-dried Li-HA-CS scaffolds. The pores are dense, uniform and interconnected, which facilitate the exchange of nutrients and cellular wastes. The deposition of Li-HA makes the wall of CS rough, enhancing the conduction of cell attachment and proliferation.

In the cell experiment, Li-HA-CS group shows a significantly higher cell proliferation than the control group (without any scaffolds), suggesting that the scaffold has positive biological effect.

The FTIR spectra determines characteristic groups for HA. In addition, HA and Li-HA show similar XRD patterns, indicating that low-dose lithium substitution does not change the crystal structure of HA. The broad peaks in HA and Li-HA XRD patterns suggest that HA in these samples are low crystallinity and a higher crystallinity can be observed in Li-HA-CS.



SEM micrographs of Li-HA-CS

