Hierarchically Ordered Polymer Nanofibers for Biomimetic Applications

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Objective: Develop nano-scale mimicking biodegradable bone material using mineralized Poly(L-lactide) Nanofiber Shish Kebabs (PLLA NFSK)

Approach:
1. Electrospun PLLA nanofibers.
2. Polymer solution crystallization used to make NFSK.
3. NFSK mineralized in simulated body fluid to create hydroxyapatite mineral coating.

Results/Impact:
- PLLA NFSK systematically created for the first time.
- Two methods of PLLA NFSK formation: dissolution and recrystallization or solution crystallization.
- Annealing fibers can hinder NFSK formation.
- NFSK can be successfully mineralized to crystalline calcium phosphate phase.

Future Work:
- Mechanical testing of Mineralized NFSK.
- NFSK reinforced composite.
- Cell studies.

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