Ice in Nature Creates Beautiful Comb-Pattern Formation on 3D-Structured Cobalt Foam

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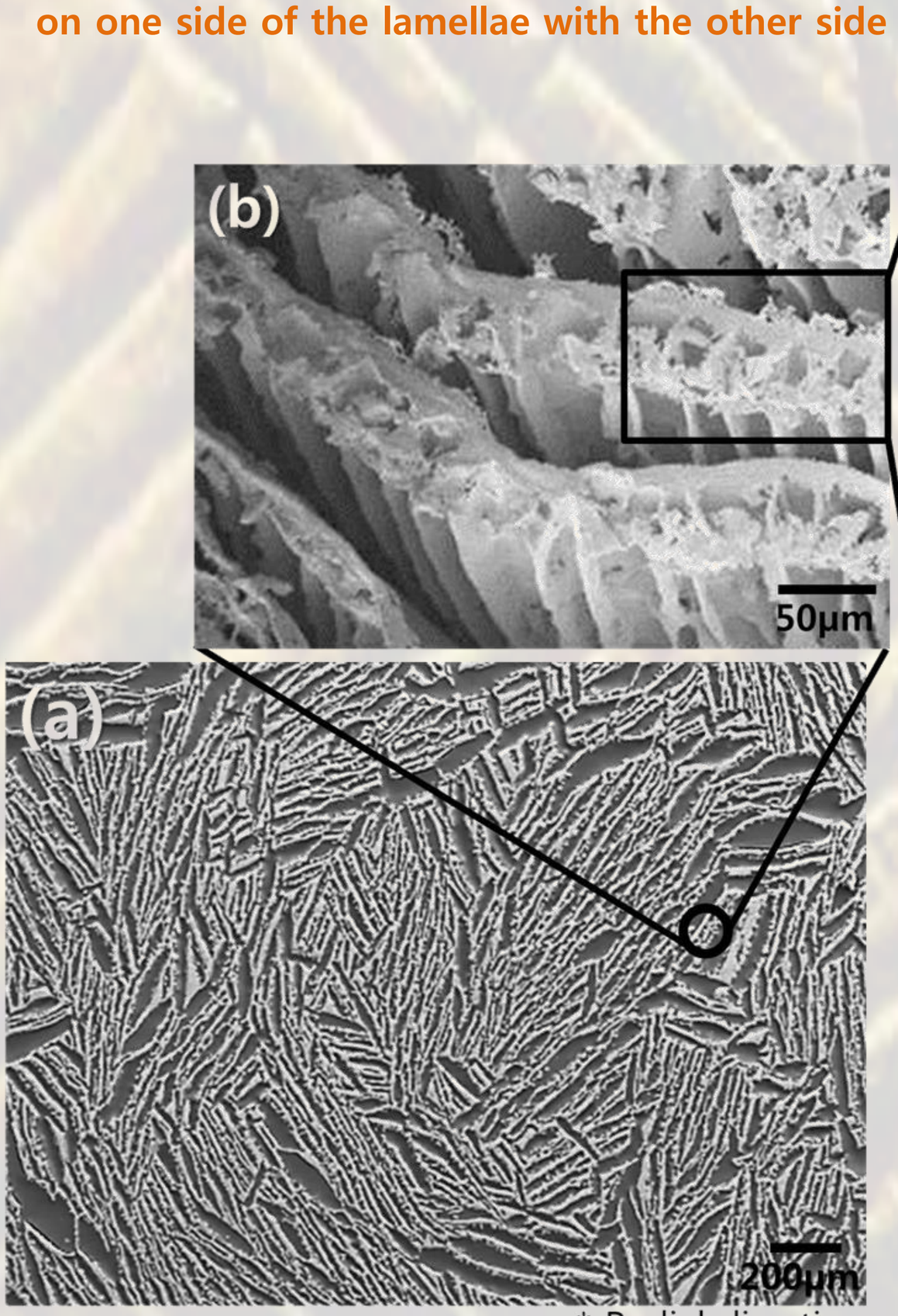
1. **Objective :** Microporous Co foams can be widely used in various applications, such as catalysts, sensors, batteries, and bio-materials, owing to the large specific surface area.

2. **Sample :** Three-dimensional porous Co foams with elongated, aligned micropores

3. **Method :** We propose a simple method for fabricating three-dimensional porous Co foams with elongated, aligned pores of a few tens of microns in size through a freeze-casting process.
   The method consists of freezing of metal & water based slurry, sublimation of the solidified phase from the solid (ice) to the gas state (steam), and subsequent sintering, finally resulting in a porous structure.

1. **Results :** The three-dimensional porous Co foams with elongated, aligned lamellar-struts 13 ± 2 μm in thickness and pores 20 ± 4 μm in diameter could be confirmed from the corresponding SEM images (Fig. a-e). In particular, it is of great interest to note that lamellar-struts are discovered only on one side of the lamellae with the other side being relatively flat (Fig. b-c).



* Radial direction

* Longitudinal direction