Lecture 8. Carbon aerogel based on wood

Chen et al. (Chen et al., 2020) proposed a facile and sustainable strategy to fabricate a wood-derived elastic carbon aerogel with a tracheid-like texture from cellulose nanofibers (CNFs) and lignin. An elastic carbon aerogel with ordered tracheid-like structure can be successfully fabricated from wood-derived CNF and lignin by rationally designing the architecture and reducing the thermal degradation of aerogel network. The flexible CNFs entangle into interconnected network, while AL with high thermal stability reduces the thermal deformation of 3D network, thus giving rise to a highly stable structure. The carbon aerogel reveals high compressibility, elasticity, and excellent fatigue resistance. When being used as a sensor, the carbon aerogel shows a high linear sensitivity at wide working range, enabling its application in wearable devices for detecting human biosignals. Furthermore, when being used as an electrode for supercapacitor, the free- standing and flexible SSC exhibits remarkable electrochemical performances, including high capacitance, high energy density, excellent cycling stability, and outstanding mechanical flexibility.

Yang et al. (Yang et al., 2021) prepared carbon aerogel using the cellulose extracted from the luffa sponge for adsorption of diesel oil (Fig. 1). Authors modified obtained carbon aerogels using trichlorosilane to enhance the adsorption capacity for diesel oil. Modified carbon aerogel had better adsorption capacity for diesel oil (49.62 g/g) than aerogel (5.2 g/g) and carbon aerogel (32.34 g/g).

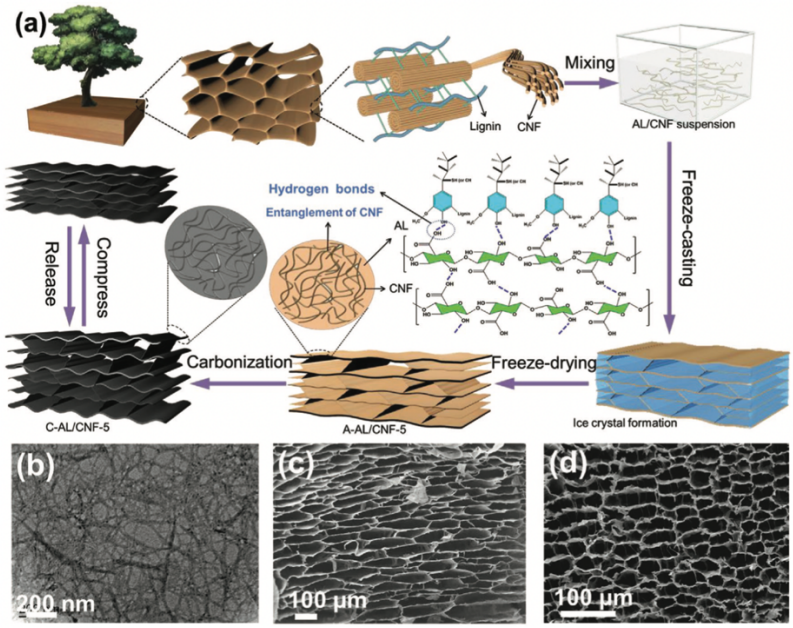

Fig. 1. Schematic illustration of the formation process of wood-derived carbon aerogels. Reprinted with permission from (Chen et al., 2020)

Literatures

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