Lecture 7. Carbon aerogels derived from waste pomelo peels

Zhu et al. (Zhu et al., 2017) prepared carbon aerogels using pomelo peels as the carbon sources via pyrolysis process at 600, 700, and 800 °C (Fig. 1). Obtained pomelo peel-based carbon aerogels are shown that their characteristics depend on pyrolysis carbonization temperature. These aerogels had an interconnected 3D porous morphology and SSA between 466 and 759.7 m^2/g. A kind of environmentally friendly, cheap, porous, and amorphous carbon aerogel derived from waste pomelo peels was prepared via pyrolysis at different temperatures (600-800°C) and characterized by SEM, TEM, XRD, FTIR, Raman and BET. The results indicated that the as-prepared PPCA had an interconnected 3D porous morphology, an amorphous carbon structure, rich hydrophobic functional groups and large specific surface area (466.0-759.7 m /g). The characteristics of the carbon materials from PPs were closely related to the pyrolysis carbonization temperature. Specifically, the higher the pyrolysis carbonization temperature, the higher graphitization degree, less hydrophilic groups, more defect structure, smaller pore size, and larger specific surface area, etc. More importantly, the static sorption experiments revealed that PPCA had excellent sorption ability while it decreased slightly when the calcination temperature increased from 600 °C to 800 °C for all kinds of organic matters. And the satisfactory recyclability of sorbent was well confirmed by the simple adsorption-regeneration experiments. Considering the advantages of PPCA in cost, sorption capacity, recyclability and environmentally, it showed wide application prospects in the field of water treatment.

Wang et al. (Wang et al., 2017) proposed the preparation method of the carbon aerogel using waste durian shell (DSCA) as the biomass precursor and its application in the removal of organic pollutants (Fig. 3c). Li et al. (Li et al., 2018) converted the biomass of cocoon into a heteroatom (N, S and Fe) ternary-doped, porous carbon aerogel (HDCA) catalyst. Vazhayal et al. (Vazhayal et al., 2020) developed carbon aerogels using waste tissue paper (WTP) and poly(vinyl alcohol) (PVA) as a carbon source.

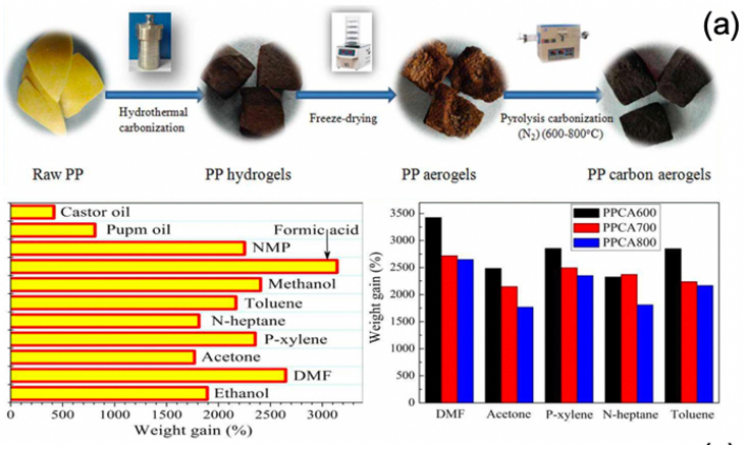

Fig. 1. Schematic illustration of the formation process of pomelo peel derived carbon aerogels. Reprinted with permission from (Zhu et al., 2017)

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