Contribution ID: **15** Type: **not specified**

Microwave-Based Oxidation Process for Carbon Fiber

Wednesday, 13 March 2024 15:45 (5 minutes)

The conventional process of carbon fiber has several stages, including oxidation, pre-carbonization, and carbonization. The oxidation is the most time-consuming one, taking approximately 90-120 minutes at temperatures ranging from 200-300℃. According to previous research, using the properties of microwaves can significantly reduce the oxidation process time to a total of 13 minutes (8+5 minutes) with a two-step process. The goal of this experiment is to design a small-scale yield continuous microwave system to efficiently transform the precursor, PAN fiber, into oxidation fiber. The cavity design used HFSS to simulate the electromagnetic and thermal field distributions, ensuring that the cavity parameters meet the desired specifications. Following the experiment, samples will undergo various measurements, including density and dielectric properties, among other tests, to confirm that the degree of oxidation matches the required level for oxidized fibers.

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Session Classification: Poster

Track Classification: Poster section