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(54) **Title:** CARBON AEROGEL-BASED CATHODES FOR LITHIUM-SULFUR BATTERIES

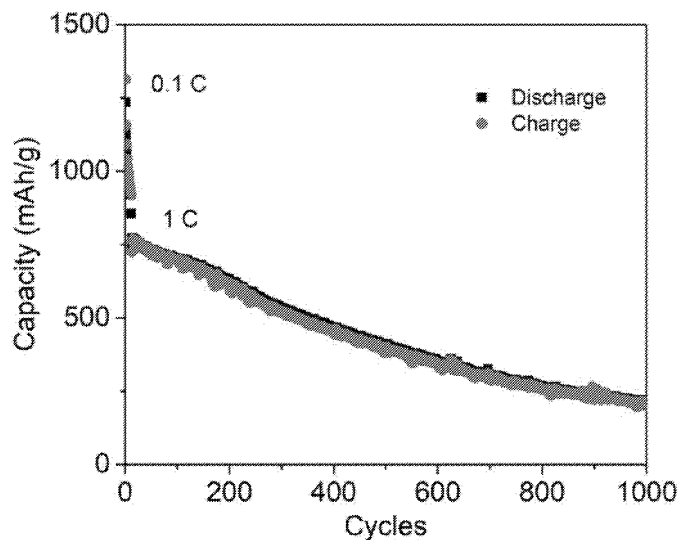


FIG. 6

(57) **Abstract:** Nanoporous carbon-based scaffolds or structures, and specifically carbon aerogels and their manufacture and use thereof. Embodiments include a sulfur-doped cathode material within a lithium-sulfur battery, where the cathode is collector-less and is formed of a binder-free, monolithic, polyimide-derived carbon aerogel. The carbon aerogel includes pores that surround elemental sulfur and accommodate expansion of the sulfur during conversion to lithium sulfide. The cathode and underlying carbon aerogel provide optimal properties for use within the lithium-sulfur battery.

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