

# **Microbial Utilization of Black Carbon's Electron Storage Capacity and Its Climate Implications/Impact**

PEI CHIU, DANHUI XIN, WEILA LI AND JIWON CHOI

University of Delaware

Presenting Author: [pei@udel.edu](mailto:pei@udel.edu)

Pyrogenic black carbon (BC) is an integral part of the global carbon cycle. Every year, 114–383 million tons of BC is produced (Tg C/y) globally through wildfires, deforestation, and other natural and anthropogenic processes. We have shown that BC produced from plant-based biomass (e.g., wood, grass, cellulose, lignin) possesses a significant electron storage capacity of 0.5 - 7.0 mmol per gram (i.e., each gram of BC can store on the order of a billion trillion electrons in its structure). We further showed that a significant fraction of BC's electron storage capacity is accessible to microorganisms. This has multiple important and previously unrecognized implications. In this paper, we will present experimental data of BC-supported microbiological transformation processes, and discuss the relevance and implications of these results for biogeochemistry, global climate, and contaminant fate.