

BIOCHAR-DERIVED ADVANCED MATERIALS

1) Developing and testing engineered biomass-derived carbons as anodes for post-lithium batteries (Na-ion and K-ion chemistries).

Tasks to perform: synthesis and physicochemical characterisation of biomass-derived carbons obtained via chemical and physical activation of both undoped and N-doped pyrolytic chars; assembly of swagelok-type half batteries using biomass-derived carbons as anodes; measuring the electrochemical performance through galvanostatic charge-discharge tests for a number of cycles.

2) Production of tailored biomass-derived adsorbents for biogas upgrading.

Tasks to perform: synthesis and physicochemical characterisation of biomass-derived carbons obtained via chemical and physical activation of both undoped and N-doped pyrolytic chars; measuring the CO₂ adsorption capacities of produced adsorbents under both equilibrium (adsorption isotherms) and dynamic conditions; conducting cyclic breakthrough experiments in a fixed bed under both PSA and VSA configurations.

Additional info: MSc students will join a research group working in several National and European funded projects. The research group is currently working on developing biochar-derived advanced materials for applications in adsorption, catalysis and electrochemical energy storage.

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