

Non-covalent functionalisation of amorphous carbon from D-Glucose as a novel catalyst for renewable fuels

ABSTRACT

A renewable carbon catalyst was developed based on the non-functionalisation method. Three different pyrolysis temperatures at 400°C (SC400), 500°C (SC500) and 600°C (SC600) were used to prepare amorphous carbon. The non-covalent functionalisation was carried out by 1-pyrenesulfonic acid (1-PSA) in organic solvents such as ethanol, heptane and dimethylformamide (DMF), and characterised by total acidity, TGA, FT-IR, SEM-EDX, particle size, BET Porosity, and XRD. The total acidity was found to be 1.58 mmol/g for catalyst SC400. The functional groups –COOH, –OH, –SO₃H and π - π stacking were detected. The amorphous carbon was stable until 500°C. The sulphur content was found to be 0.013mmol/g for SC400. This research approach focused on the direct interaction of carbonaceous support with pyrene moieties and terminal groups (–SO₃H) acting as catalytic acid sites that open a new way to be explored for performing liquid-phase heterogeneous acid-catalysed reactions.