GRAPHENE AND 2DM VIRTUAL CONFERENCE & EXPO

Graphene online 2020 October 19-23

SPONTANEOUS WATER DESALINATION IN GRAPHENE OXIDE FRAMEWORK

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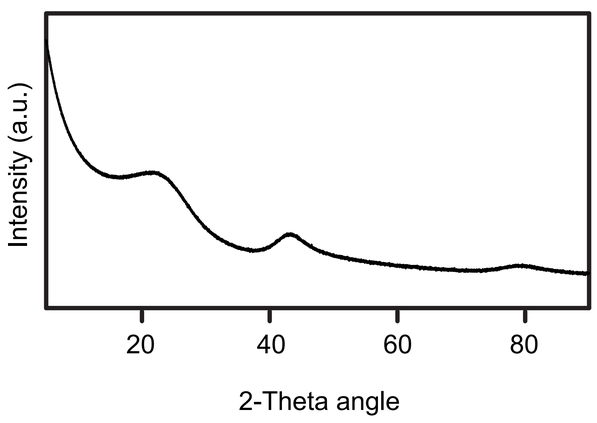
Background: ACTIVATED CARBONS

- Synthesis: carbonization of PEEK and subsequent steam-activation

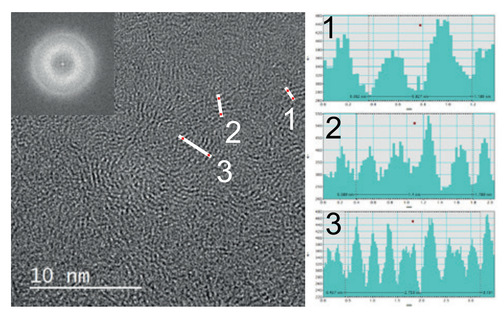
small pore volume created by carbonization
pore volume and average pore size increase proportionally to activation time

- Structure: amorphous but presence of nm-sized ordered graphitic domains

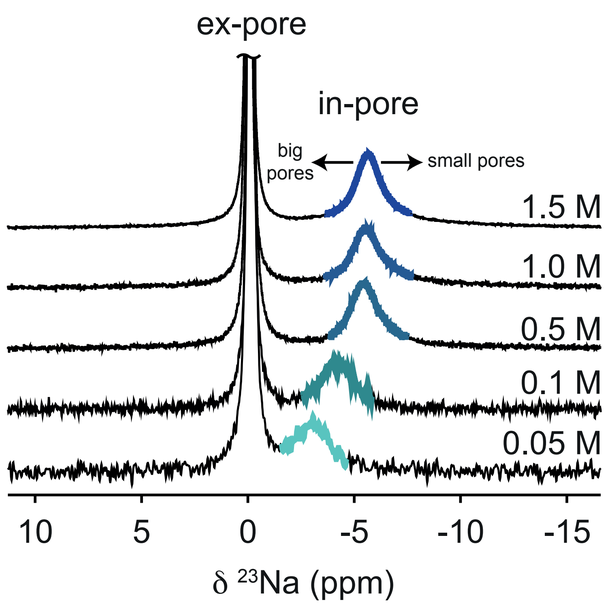
Powder X-Ray Diffraction



Transmission Electron Microscopy

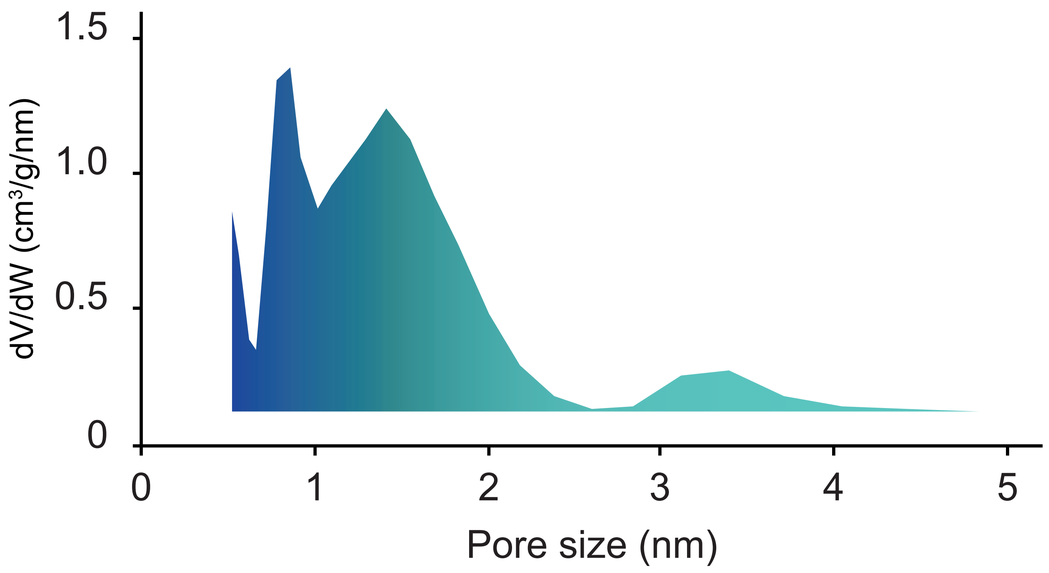


Nuclear Magnetic Resonance



saturate sample with NaCl(aq)
Na^+ ions reach equilibrium distribution across the pore network
position of Na^+ in-pore peak depends on average perceived pore size

Gas Adsorption

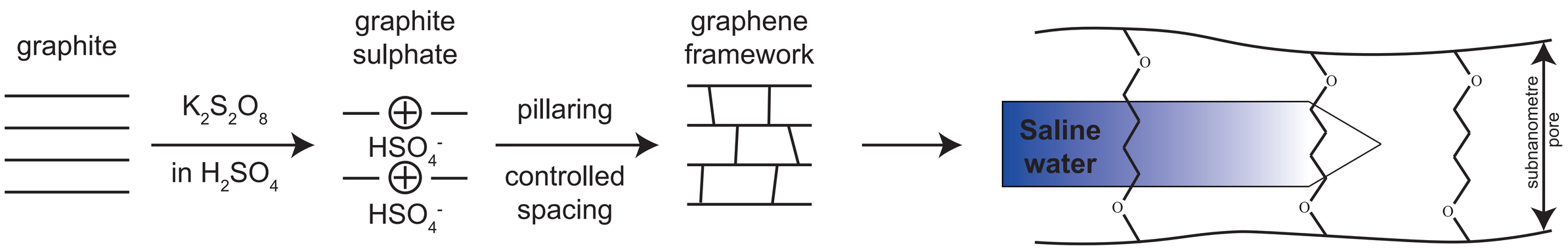


liquid N_2 populates the pores at specific pressures depending on their sizes
introduce known volumes of N_2 into pores of increasing size
3 distinct pore size populations (0.8 nm, 1-2 nm, 3-4 nm)

Na^+ enters subnanometre pores only at high concentrations

Application: SPONTANEOUS WATER DESALINATION

- Pore requirement: hydrophobic/ionophobic, subnanometre size, open-ended, stable in saline water
- Target material: graphene-based framework, apolar pillars, e.g. alkyl-ether



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Graphene online 2020