

# Internal Nanoporosity of Porous Graphene

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A new type of graphene nanostructure with inaccessible nanopores is prepared in this work. The high surface area porous graphene (PG) is firstly prepared by KOH activation method [1]. By blocking the pore entrance of PG, the interpores become inaccessible. The oxidation treatment in air can create nanowindows on pore-blocked PG, as a result, reopens the internal nanospace and recover the porosity partially. The surface area and pore volume of reopened PG recover up to 77% and 76% of pristine PG, respectively. The comparison plot of the adsorption isotherms of reopened PG against pristine PG is straight in general, suggesting that the porous structure is mainly preserved after the blocking-opening process.

A pitch-based activated carbon fiber (ACF) and a commercial activated carbon (AC) are also studied for comparison. Similarly, the pore entrances of ACF and AC can be blocked and reopened. However, the porosity recovery of ACF and AC is much lower than that of porous graphene due to their more intricate structure. Nevertheless, the inaccessible nanospace, which was only reported on single wall carbon nanotube (SWCNT) [2] and single wall carbon nanohorn (SWCNH) [3] before, become possible in variety of porous carbons. Such porous carbon with inaccessible nanospace can provide a new perspective on energy, environmental and medical science.

## References

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