

Template carbon for H₂ storage

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Template Carbon For H₂ Storage

Introduction

Well ordered porous carbon materials have potential applications in gas storage, adsorbents and catalyst supports. Hydrogen uptake, which occurs via physisorption, was found to positively correlate with specific surface area and micropore volume.

Method

- CVD at a heating rate of 5°C/min
- Template: Zeolite Y
- Carbon precursor: Benzene
- Duration: 3 hours
- Removal of zeolite template by soaking in 46%HF for 24 hours

Results

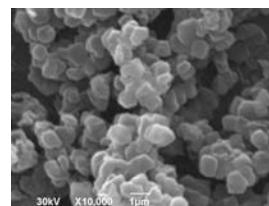
Temperature (°C)	Surface area (m ² /g)	Total pore volume (cm ³ /g)	Micropore volume (cm ³ /g)
700	1263	0.465	0.314
850	711.7	0.332	0.100
950	17.57	0.011	0.000

Conclusion

Benzene CVD at 700°C results in graphitic structural ordering with micropores of size ~11Å, surface area of 1263m²/g and micropore volume of 0.314cm³/g.

SEM

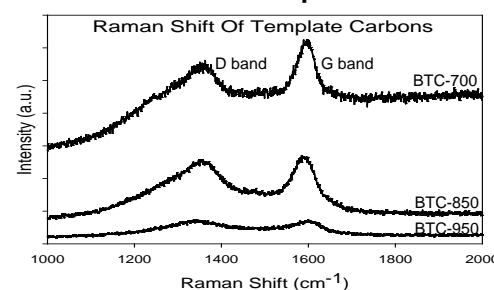
- Similar sphere-like particles of zeolite Y and template carbon, implying transferred morphology



Template carbon at 850°C

Raman Spectroscopy

- Relative intensity of band G increased for lower CVD temperatures



Pore Size Distribution

- Major micropore peak of pore size ~11 Å

