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Template carbon for H2 storage

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URECA

Undergraduate Research Experience on CAmpus

Category: 2 Project ID: SCBE08049 Student: Teo Wei Suong

School of Chemical and Biomedical Engineering

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 (m²/g)	Total pore volume (cm³/g)	Micropore volume (cm³/g)
700	1263	0.465	0.314
850	711.7	0.332	0.100
950	17.57	0.011	0.000

Conclusion

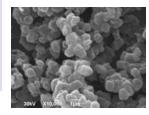
Benzene CVD at 700°C results in graphitic structural ordering with micropores of size ~11Å, surface area of 1263m²/g and micropore volume of 0.314cm³/g.

Project Title: Fabricate Template Carbon for H₂ Storage

Supervisor: Asst Prof Wang Kean

<u>SEM</u>

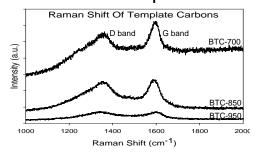
 Similar sphere-like particles of zeolite Y and template carbon, implying transferred morphology



Template carbon at 850°C

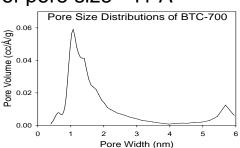
Raman Spectroscopy

 Relative intensity of band G increased for lower CVD temperatures



Pore Size Distribution

 Major micropore peak of pore size ~11 Å



Collaborators: Song Xianghua