

# Web of Science

Search

Search Results

My Tools ▾

Search History

Marked List

 Look Up Full Text


Save to EndNote online ▾

Add to Marked List

694 of 723

## Fuel cell based on novel hyper-branched polybenzimidazole membrane

By: Liu, C (Liu, Changzhi)<sup>[1]</sup>; Khan, SB (Khan, Sher Bahadar)<sup>[2,3]</sup>; Lee, M (Lee, Minju)<sup>[1]</sup>; Kim, KI (Kim, Kwang In)<sup>[1]</sup>; Akhtar, K (Akhtar, Kalsoom)<sup>[4,5]</sup>; Han, H (Han, Haksoo)<sup>[1]</sup>; Asiri, AM (Asiri, Abdullah M.)<sup>[2,3]</sup>

[View ResearcherID and ORCID](#)

### MACROMOLECULAR RESEARCH

Volume: 21 Issue: 1 Pages: 35-41

DOI: 10.1007/s13233-012-0191-2

Published: JAN 2013

[View Journal Impact](#)

### Abstract

A novel hyper-branched polybenzimidazole (HB-PBI) has been synthesized and efficiently utilized as a conducting polymer for the fabrication of an efficient high temperature fuel cell. The developed fuel cell showed outstanding proton conductivity (0.168 Scm<sup>-1</sup>) at 150 A degrees C) along with excellent single cell performance, displaying a maximum power density of 0.346 Wcm<sup>-2</sup>). The HB-PBI has been synthesized by polymerization of bibenzimidazole diterephthalic acid (BBIDTA) and 3,3'-diaminobenzene in the presence of poly phosphoric acid while the BBIDTA was synthesized by treating trimellitic anhydride with 3,3'-diaminobenzene. Both HB-PBI and BBIDTA were structurally characterized by nuclear magnetic resonance (H-1 and C-13 NMR). HB-PBI showed high thermal stability and mechanical properties, findings that were corroborated by thermogravimetric analysis and use of a universal testing machine. Additionally, proton conduction and the thermal and mechanical properties of HB-PBI were compared with polybenzene imidazole (m-PBI), and found that HB-PBI has higher proton conducting, thermal and mechanical properties.

### Keywords

**Author Keywords:** polybenzimidazole; proton exchange membrane; fuel cell; thermal properties; mechanical properties

**KeyWords Plus:** COPOLYMER COMPOSITE MEMBRANES; POLYMER ELECTROLYTE MEMBRANES; ACID DOPED POLYBENZIMIDAZOLE; SULFONATED POLYIMIDE; METHANOL; PERFORMANCE; STABILITY; NETWORKS; HYDROGEN

### Author Information

**Reprint Address:** Khan, SB (reprint author)

[-] King Abdulaziz Univ, Ctr Excellence Adv Mat Res, POB 80203, Jeddah 21589, Saudi Arabia.

**Organization-Enhanced Name(s)**

King Abdulaziz University

### Addresses:

[+] [ 1 ] Yonsei Univ, Dept Chem & Biomol Engrn, Seoul 120749, South Korea

[-] [ 2 ] King Abdulaziz Univ, Ctr Excellence Adv Mat Res, Jeddah 21589, Saudi Arabia

**Organization-Enhanced Name(s)**

King Abdulaziz University

[-] [ 3 ] King Abdulaziz Univ, Dept Chem, Fac Sci, Jeddah 21589, Saudi Arabia

**Organization-Enhanced Name(s)**

King Abdulaziz University

## Citation Network

9 Times Cited

31 Cited References

[View Related Records](#)



**Create Citation Alert**

*(data from Web of Science Core Collection)*

### All Times Cited Counts

9 in All Databases

9 in Web of Science Core Collection

0 in BIOSIS Citation Index

1 in Chinese Science Citation Database

0 in Data Citation Index

0 in Russian Science Citation Index

0 in SciELO Citation Index

### Usage Count

Last 180 Days: 5

Since 2013: 54

[Learn more](#)

### Most Recent Citation

Hu, Mei-shao, [Preparation and Properties of Branched Poly\(aryl ether benzimidazole\) High Temperature Proton Exchange Membranes](#). ACTA POLYMERICA SINICA, MAR 20 2017.

[View All](#)

### This record is from:

**Web of Science Core Collection**  
- Science Citation Index Expanded

### Suggest a correction

If you would like to improve the quality of the data in this record, please [suggest a correction](#).

+ [ 4 ] Ewha Womans Univ, Div Nano Sci, Seoul 120750, South Korea

+ [ 5 ] Ewha Womans Univ, Dept Chem, Seoul 120750, South Korea

E-mail Addresses: [sbkhan@kau.edu.sa](mailto:sbkhan@kau.edu.sa); [hshan@yonsei.ac.kr](mailto:hshan@yonsei.ac.kr)

### Funding

Funding Agency	Grant Number
National Research Foundation of Korea	
	NRF-2009-C1AAA001-0092926
	2011-0016750

[View funding text](#)

### Publisher

SPRINGER, VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS

### Categories / Classification

Research Areas: Polymer Science

Web of Science Categories: Polymer Science

### Document Information

Document Type: Article

Language: English

Accession Number: WOS:000314280900006

ISSN: 1598-5032

eISSN: 2092-7673

### Journal Information

Table of Contents: [Current Contents Connect](#)

Impact Factor: [Journal Citation Reports](#)

### Other Information

IDS Number: 080YQ

Cited References in Web of Science Core Collection: 31

Times Cited in Web of Science Core Collection: 9