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# Imidazolium-functionalized Poly (arylene ether ketone) Cross-linked Anion Exchange Membranes

Xinming Du<sup>a,b</sup>, Zhe Wang<sup>a,b,\*</sup>, Wenchang Liu<sup>a</sup>, Jingmei Xu<sup>a,b</sup>, Zhaoyu Chen<sup>a</sup>,  
Chunmei Wang<sup>a</sup>

<sup>a</sup>College of Chemical Engineering, Changchun University of Technology, Changchun 130012, China

<sup>b</sup>Advanced Institute of Materials Science Changchun University of Technology, Changchun 130012, China

\*Corresponding authors, E-mail addresses: wzcut@126.com (Z. Wang). Tel.: 86 431 85716155; fax: 86 431 85716155.

## Abstract

A series of phenolphthalein-based poly (arylene ether ketone) (PEK) copolymer are synthesized to prepare anion exchange membranes (AEMs). The ion group 1-vinyl imidazole is introduced on the unit of phenolphthalein-based as a hydrophilic segment and cross-linking agent. The structure of resulting membranes was investigated by <sup>1</sup>H NMR and FT-IR. The well-defined microphase-separated structures were verified by TEM and SAXS profiles. The cross-linked membrane of ImPEK-0.4 exhibits high hydroxide conductivity (0.0836 S/cm, at 80 °C), excellent mechanical performance (69.6 MPa) and the maximum swelling ratio is only 7.95% at 80 °C. Furthermore, the excellent alkaline stability is demonstrated by immersing the prepared membrane in 1 M NaOH at 40 °C for 400 h. The ionic conductivity is still high to 0.0381 S/cm for ImPEK-0.4. These results indicate that combining phase separation architecture and

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