

论文

## 一种杂环磺化聚芳醚腈酮质子交换膜材料的合成及表征

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**摘要** 用含二氮杂萘酮结构类双酚DHPZ, 3,3'-二磺酸钠基-4,4'-二氟二苯酮, 2,6-二氯苯腈以及4,4'-二氟二苯酮, 通过缩合共聚合反应合成了一系列不同磺化度、高分子量的磺化聚芳醚腈酮. 聚合物特性粘数为0.58~2.0 dL/g. 用红外光谱(FT-IR), 核磁共振谱(<sup>1</sup>H-NMR)表征了聚合物结构. 用差示扫描量热仪(DSC)和热重分析仪(TGA)研究了聚合物的耐热性能, 研究表明其玻璃化温度(*T<sub>g</sub>*)可达352℃, 5%热失重温度大于500℃. 以N-甲基吡咯烷酮为溶剂, 溶液浇铸法制备了聚合物膜, 并测定了膜的溶胀率以及质子交换能力. 结果表明, 与Nafion膜相比, 磺化聚芳醚腈酮膜在相同的质子交换能力条件下, 溶胀率显著降低.

**关键词** [二氮杂萘联苯酮](#) [直接缩合聚合](#) [聚芳醚腈酮](#) [质子交换膜](#) [磺化](#)

分类号

## SYNTHESIS AND CHARACTERIZATION OF SULFONATED POLY (PHTHALAZINONE ETHER NITRILE KETONE)S FOR PROTON EXCHANGE MEMBRANE

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**Abstract** Sulfonated poly(phthalazinone ether nitrile ketone)s(SPPENK)with pendent sulfonate groups were synthesized by direct polycondensation from 4-(4-hydroxyphenyl)-1(2H)-phthalazinone(DHPZ),disodium 3,3'-disulfonate-4,4'-difluorobenzophenone (SDFB),4,4'-difluorobenzophenone (DFB)and 2,6-dicholobenzene (DCBN). The intrinsic viseosity of SPPENK was in the range of 0.58~2.0 dL / g. FT-IR,<sup>1</sup>H-NMR and wide-X-ray scattering were used to characterize the structures of the copolymers. The thermo-stability of the copolymers was detected by DSC and TGA. Tough films were cast successfully from N-methylpyrrolidone solutions. The ion exchange capacity (IEC) values were 0.91~2.06 meq·g<sup>-1</sup>. The swelling ratios of resulted membranes were 9%~21%, which is much lower than those of Nafion1135 and other reported sulfonated poly(aryl ether ketone)s and poly(aryl ether sulfone)s membranes with the same ion exchange capacity.

**Key words** [Direct polymerization](#) [Poly \(phthalazinone ether nitrile ketone\)](#) [Proton exchange membrane](#) [Sulfonation](#)

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