

论文

CuPc(COOH)₈-SA/CuTAPc-CS双极膜的制备及表征

陈日耀¹, 陈震^{1,2}, 郑曦¹, 陈晓¹, 倪世茂¹, 尤春满¹

1. 福建师范大学化学与材料学院, 福州 350007;
2. 宁德师范高等专科学校化学系, 宁德 352100

摘要:

分别用八羧基铜酞菁[CuPc(COOH)₈]和四氨基铜酞菁(CuTAPc)改性海藻酸钠(SA)阳膜层和壳聚糖(CS)阴膜层, 制备了CuPc(COOH)₈-SA/CuTAPc-CS双极膜. 实验结果表明, 经八羧基铜酞菁和四氨基铜酞菁改性后, 促进了双极膜中间层水的解离, 增大了阳离子交换膜层和阴离子交换膜层的离子交换容量及H⁺和OH⁻的透过率. 与Fe³⁺改性的Fe-SA/mCS双极膜相比, CuPc(COOH)₈-SA/CuTAPc-CS双极膜的阻抗、电阻压降(即IR降)和溶胀度降低. 当电流密度高达120 mA/cm²时, CuPc(COOH)₈-SA/CuTAPc-CS双极膜的IR降仅为0.9 V.

关键词: 八羧基铜酞菁; 四氨基铜酞菁; 海藻酸钠; 壳聚糖; 双极膜

Preparation and Characterization of CuPc(COOH)₈-SA/CuTAPc-CS Bipolar Membrane

CHEN Ri-Yao¹, CHEN Zhen^{1,2*}, ZHENG Xi¹, CHEN Xiao¹, NI Shi-Mao¹, YOU Chun-Man¹

1. College of Chemistry and Materials Science, Fujian Normal University, Fuzhou 350007, China;
2. Chemistry Department of Fujian Ningde Teachers College, Ningde 352100, China

Abstract:

The sodium alginate(SA) cation layer and the chitosan(CS) anion layer were modified by copper octocarbonyphthalocyanine[CuPc(COOH)₈] and copper tetraaminophthalocyanine(CuTAPc) to prepare the CuPc(COOH)₈-SA/CuTAPc-CS bipolar membranes(BPM). The ion exchange capacity and hydrogen ion transmigration rate of the CuPc(COOH)₈-SA cation exchange membrane, and the ion exchange capacity and hydroxide ion transmigration rate of the CuTAPc-CS anion exchange membrane were increased. The water splitting rate at the interlayer of the CuPc(COOH)₈-SA/CuTAPc-CS BPM was promoted. In comparison with the Fe-SA/mCS BPM modified by Fe³⁺, the membrane impedance, IR drop and swelling degree of the CuPc(COOH)₈-SA/CuTAPc-CS BPM all obviously decreased. The IR drop of the CuPc(COOH)₈-SA/CuTAPc-CS BPM was 0.9 V at a higher current density of 120 mA/cm².

Keywords: Copper octocarbonyphthalocyanine; Copper tetraaminophthalocyanine; Sodium alginate; Chitosan; Bipolar membrane

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通讯作者: 陈震, 男, 博士, 研究员, 博士生导师, 主要从事膜科学方面研究. E-mail: zc1224@publ.fz.fj.cn

作者简介:

参考文献:

- [1]FU Rong-Qiang(傅荣强), XU Tong-Wen(徐铜文), YANG Wei-Hua(杨伟华). Membrane Science and Technology(膜科学与技术)[J], 2002, 22(6): 42—47
- [2]Schaffner F., Pontaher P. Y., Sanchez V., et al.. Desalination[J], 2004, 170(2): 113—121
- [3]Hsueh C. H., Peng Y. J., Wang C. C., et al.. J. Membr. Sci.[J], 2003, 219(1): 1—13
- [4]Mafe S., Ramirez P., Alcaraz A., et al.. Handbook on Bipolar Membrane Technology[M], Enschede:Twente University Press, 2000: 49—78

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- [5]Hao J. H., Chen C. X., Li L., et al.. J. Appl. Polym. Sci.[J], 2001, 80(10): 1658—1663
- [6]Simons R.. Electrochim. Acta[J], 1986, 31(9): 1175—1177
- [7]Simons R. G., Bay R.. High-performance Bipolar Membranes, US 5227040[P], 1993-7—13
- [8]MO Jian-Xiong(莫剑雄). Technology of Water Treatment(水处理技术)[J], 1998, 24(4): 187—194
- [9]Chlanda F. P., Lan M. J.. Bipolar Membranes and Methods of Making Same, US 4766161[P], 1988-8—23
- [10]XUE Yan-Hong(薛艳红), XU Tong-Wen(徐铜文). Membrane Science and Technology(膜科学与技术)[J], 2008, 28(3): 5—9
- [11]XU Cai-Xia(许彩霞), CHEN Ri-Yao(陈日耀), ZHENG Xi(郑曦), et al.. Chinese J. Appl. Chem.(应用化学)[J], 2008, 25(3): 317—321
- [12]WANG Yan-Hong(王嫣红), MA Xiu-Ling(马秀玲), CHEN Ri-Yao(陈日耀), et al.. Acta Phys. Chim. Sin.(物理化学学报)[J], 2008,24(6): 1041—1046
- [13]HUANG Zhen-Xia(黄振霞), HUANG Xue-Hong(黄雪红), CHEN Ri-Yao(陈日耀), et al.. Acta Chim. Sin.(化学学报)[J], 2007,65(21): 2466—2472
- [14]Braun A., Tchemiac T. C.. Ber. Dtsch. Chem. Ges.[J], 1907, 40: 2709—2714
- [15]Mehmet K., Meryem N. U., Yara S.. Polyhedron[J], 2002, 21(3): 255—263
- [16]SHEN Yong-Jia(沈永嘉). Synthesis and Application of Phthalocyanine(酞菁的合成与应用)[M], Beijing: Chemical Industry Press, 2002
- [17]Boston D. R., Bailar J. C.. Inorg. Chem.[J], 1972, 11(7): 1578—1583
- [18]CONG Fang-Di(丛方地), DU Xi-Guang(杜锡光), ZHAO Bao-Zhong(赵宝中), et al.. Journal of Molecular Science(分子科学学报)[J], 2003, 19 (1): 26—32
- [19]Xu C. X., Chen R. Y., Zheng X., et al.. J. Membr. Sci.[J], 2008, 307(2): 218—224
- [20]Yang J. M., Su W. Y., Leu T. L., et al.. J. Membr. Sci.[J], 2004, 236(1/2): 39—51
- [21]WANG Fang(王方). Ion Exchange Application Technology(离子交换应用技术)[M], Beijing: Beijing Science and Technology Press, 1990
- [22]WANG Zhen-Kun(王振堃). Ion Exchange EmbranePreparation, Performance and Application(离子交换膜制备、性能及应用)[M], Beijing: Chemical Industry Press, 1986
- [23]Guibal E., Milot C., Roussy J.. Water Environ. Res.[J], 1999, 71(1): 10—17
- [24]CHEN Ni-Na(陈妮娜), CHEN Ri-Yao(陈日耀), ZHENG Xi(郑曦), et al.. Chem. J. Chinese Universities(高等学校化学学报)[J], 2008, 29(3): 578—584
- [25]Lee Y. M., Shin E. M., Noh S. T.. Die Angewandte Makromolekulare Chemie[J], 1991, 192(1): 169—181

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