膨润土/聚丙烯酸钠超吸水性复合材料的合成和导电水凝胶研究

论文标题:膨润土/聚丙烯酸钠超吸水性复合材料的合成和导电水凝胶研究
Study on the Synthesis and Conductive Hydrogel of Poly Sodium Acrylate/bentonite Superabsorbent Composites
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2005-04-01论文网 http://www.lw23.com/lunwen_689808492/ 膨润土;超吸水性复合材料;反相悬浮聚合;水溶液聚合法;导电水凝胶
bentonite; superabsorbent composite; inverse suspension polymerization;aqueous solution polymerization; conductivity
超吸水性材料是一种具有松散结构的低交联的强亲水性高分子化合物。它既不溶于水,也难溶于有机物,具有吸收自身重量几百倍甚至几千倍水的能力,且吸水速率高,保水性能好,即使加压也难以把水分离出来,因此,超吸水性材料在轻工业、农业、化工和医疗卫生等部门有着广范的前途。本文采用反相悬浮聚合法和水溶液聚合法制备膨润土/聚丙烯酸钠超吸水性复合材料,研究其性能及影响因素、结构表征、导电性水凝胶等,获得以下进展: 本文以丙烯酸、膨润土为原料,环己烷为分散介质,司班60和十二烷基苯磺酸钠为分散剂,过硫酸钾为引发剂,N,N’-亚甲基双丙烯酰胺为交联剂,采用反相悬浮的方法合成了膨润土/聚丙烯酸钠超吸水性复合材料,采用水溶液法合成膨润土/聚丙烯酸钠超吸水性复合材料。本文研究了膨润土/聚丙烯酸钠超吸水性复合材料的合成条件如:引法剂的用量、交联剂的用量、膨润土的用量、温度等对其吸水性能的影响,获得适宜的合成条件。 制备的膨润土/聚丙烯酸钠超吸水性复合材料吸蒸馏水和0.9%NaCl溶液分别为1340 g/g和92 g/g,在30分钟以内吸水率达50%以上,在110℃的烘箱里烘干10小时还含有大于50%的水,说明该超吸水性复合材料具有较强的保水性,较大的吸水倍率,较快的吸水速率。 把膨润土/聚丙烯酸钠超吸水性复合材料浸入到电解质溶液中制
Superabsorbents are loosely crosslinked hydrophilic polymers, which have the ability to absorb considerable amounts of water or aqueous fluids in relatively short periods of time and retain water under pressure. Because of their excellent characteristics, superabsorbents are widely used in agriculture, horticulture, sealing composite and medicine for drug delivery and so on. The synthesis, structure, conduntive hydrogel of poly sodium acrylate/bentonite superabsorbent composites was investigated in the paper.Using acrylic acid and bentonite as start material, cyclohexane as dispersion medium, N,N"-methylene-bis-acrylamide as crosslinking agent, potassium hydroxide as initiator, Span as suspending agent, a sodium acrylicate-bentonite superabsorbent composite with even size was synthesized by inverse suspension polymerization reaction and aqueous solution polymerization. The influence of synthetic conditions, such as the concentration of crosslinker and initiator, the amount of bentonite and reaction temperature on the water absorbency of the superabsorbent composites was researched, and optimum polymerization conditions were obtained.The water absorbency and salt water absorbency of the superabsorbent composite is 1340 g/g and 92 g/g respectively. The composite has excellent performance of water retaining, which absorbed water over 50% after being dried 10 hours at 110 ℃ in oven, and the absorbed water of 50% in half an hour. Which indicated the better water absorbency, retain water and faster absorption velocity.A novel hydrogel electrolyte with conductivity 500 ms/cm was prepared by immersing poly-sodium acrylate/bentonite superabsorbent into an electrolyte aqueous solution. The hydrogel electrolyte exhibits liquid-like ionic conductivity, and the conductivity of the hydrogel electrolyte mainly depends on the ionic intensity, the pH value and temperature of the solution immersed. The water absorbency of superabsorbent has a great impact on the conductivity of the hydrogel electrolyte. But under a certain extent, the preparation condition of superabsorbent has a small influence on the conductivity of the hydrogel electrolyte.The poly (sodium acrylicate)/bentonite superabsorbent composite is characterized by scanning electron microscopy (SEM), infrared spectra, X-ray diffraction(XRD), thermogravimetry (TGA), differential scanning calorimetry (DSC) analysis. It was found that disperse property and thermal stability of the superabsorbent composites was enhanced by adding bentonite power. It was also confirmed that the bonding water and non-bongding water exist in the gel of superabsorbent composites.The structure of superabsorbent composite is reticulation.

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