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土基改性固沙植草材料抑制地表水分蒸发

Inhibiting water evaporation of ground surface by clay-based sand-fixing and grass-planting materials

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中文摘要:

针对固沙生态恢复中面临的有效水分涵养难题,采用Span-80乳化木蜡改性黏土制备了固沙植草喷膜材料。研究了材料在模拟荒漠化环境气候中的保水性能,采用紫外-可见分光光度分析、扫描电子显微镜分析、傅里叶红外光谱分析、X射线衍射分析、热重分析等手段对制备的材料进行分析和表征。结果表明:该固沙植草喷膜材料具有良好的保水性能,改性后黏土的层间结构未发生变化,木蜡均匀涂覆在土壤颗粒表面,颗粒间的孔隙由亲水孔转变为憎水孔从而抑制了水分的蒸发;植草试验表明当植草喷膜材料中木蜡、黏土、Span-80 3种组分质量比为1:6:24时固沙植草材料既能很好地抑制水分蒸发又能保持较好的透气性,草籽发芽率从对照组的5%提高至45%。

英文摘要:

According to the problem of available water conservation in sand consolidation, the sand-fixing and grass-planting materials were prepared with clay modified by emulsifying vegetable waxes and octylphenol polyoxyethylene ether (Span-80). The water retention property was studied in simulated desertification environmental climate and the materials were characterized by means of UV-Vis, SEM, FTIR, XRD and TA measurements. The results showed that the materials had excellent water retention properties, which owing to that vegetable waxes adhering evenly to clay particle surfaces, making the clay pores changing from hydrophilic to hydrophobic and so inhibiting the water evaporation. Grass-planting experiment showed that with reasonable mass ratio of vegetable waxes, clay and surfactant at 1:6:24, the materials not only inhibited water evaporation but also maintained sound air permeability so that the germination rate of grass seed was significantly improved from 5% to 45%.

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