

玉米秸秆与塑料PE共气化过程中碱金属迁移行为的研究

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Study on migration behavior of alkali metals during co-gasification of corn stalk and PE

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摘要 选取一定混合比例的玉米秸秆与塑料PE制成混合燃料,采用固定床实验台,通过改变反应温度,并结合化学热力学平衡分析、X射线衍射及扫描电子显微电镜能谱分析技术对共气化过程中碱金属的迁移行为进行研究。结果表明,气化气中碱金属以气态组元KCl、K₂Cl₂、NaCl形式存在。混合燃料中掺入塑料PE后,C、H含量增加,H使得共气化反应中更容易与Cl反应生成HCl,而非KCl,同时C更容易与K结合,导致K的释放率低于单独玉米秸秆气化,但使Na释放率增加。灰中碱金属化合物以KCl、NaCl、K₂SO₄、KAISi₃O₈、KAISiO₄、NaAISi₃O₈、NaAISiO₄为主,气化温度高于800℃后灰中K、Na、Cl更易沉积于微孔边缘。

关键词: 玉米秸秆 PE 共气化 碱金属

Abstract: The migration behavior of alkali metals during co-gasification of cornstalk and PE in a fixed bed at different temperatures was studied on the thermodynamic equilibrium calculation, the X-ray power diffraction and scanning electron microscope/energy dispersive spectrometer. The results indicat that the alkali chlorides (KCl、K₂Cl₂、NaCl)are the main components in gaseous. There is a large amounts of C and H in the fules with the mixed of plastic PE. The H makes the Cl prefer HCl to KCl, meanwhile, the release radio of K is lower than the cornstalk gasification cause of the C easily reacted with K than Na. Alkali metal compounds in ashes are mainly in the forms of KCl, NaCl, K₂SO₄, KAISi₃O₈, KAISiO₄, NaAISi₃O₈, NaAISiO₄. The KCl,NaCl begin to release when the reacting temperature above 800℃ and most of K,Na,Cl are easily deposited on the edge of the hole.

Key words: corn stalk PE co-gasification alkali metal

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