

水稻秆颗粒冷压成型工艺条件优化 Optimization of the Technology for Straw Briquette Cold Press Process

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关键词: 水稻秆 冷压成型 二次正交旋转组合设计 优化

摘要: 以水稻秆颗粒为原料, 以碱处理水稻秆颗粒为粘结剂, 采用二次正交旋转设计, 研究不同的成型压力、粘结剂添加比、含水率、原料粒径对成型燃料松弛密度以及落下强度的影响。利用SPSS 13.0的回归分析方法以及Matlab 7.1的响应面分析法, 建立并分析了4个因子对试验指标影响的数学模型。结果表明, 所得回归方程显著, 拟合情况良好; 最佳成型压力为32MPa, 粘结剂的添加比4:1, 含水率为10%, 原料粒径4mm, 在此条件下, 成型物的松弛密度达到1.188g/cm³, 成型物落下强度达65.417%。Taking particles of rice straw as material, using straw treated by alkali as binder, adopting the quadratic orthogonal rotation design, the effects of various pressure, the additive proportion of binder, the moisture content and the grain size of raw materials on the loose density and the dropping intensity of briquette fuels was studied. A mathematical model of experiment with four factors was established and analyzed by regress method in SPSS 13.0 and response method in Matlab 7.1. The results showed that the regression equation was significant. The optimum factors were as follows, the pressure was 32MPa, the additive proportion of bonder was 4:1, the moisture content was 10%, and the grain size of raw materials was 4mm. Under this condition, the loose density reaches 1188g/cm³, and the dropping intensity reaches 65.417%.

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