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### 不同贮存温度对木屑热裂解生物油理化性质稳定性的影响

#### Influence of storage temperature on stability of physicochemical properties of sawdust pyrolysis bio-oil

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中文摘要:

为了明确不同贮存温度下生物油理化性质稳定性的差异,以鼓泡流化床松木木屑快速热裂解制取的生物油为样品,考察了不同贮存温度(4℃, 27℃, 40℃)条件下,两组(1号, 2号)生物油特性随贮存时间的变化规律,同时,对贮存前后生物油进行了傅里叶变换红外光谱及气相色谱质谱联用分析。结果表明,低温(4℃)贮存使生物油含水率下降,而室温(27℃)和高温(40℃)贮存则使其含水率有所上升。在没有水分剧烈变化的影响下,生物油运动黏度上升的幅度与贮存温度相关,温度越高,上升幅度越大。各种温度下,生物油pH值没有明显的变化规律,且变化幅度也较小。通过对红外光谱典型吸收峰的频率位移和透光强度分析表明,生物油中各种官能团上电子剧烈运动,从而加强了分子间的作用力。气相色谱质谱联用分析的结果表明,35 d的高温贮存催化了一些化学反应的进行,使得生物油的组分更加复杂化。因此,低温贮存对控制生物油的不稳定性效果较佳。

英文摘要:

For the objective of understanding stability difference of physicochemical properties of bio-oil under different storage temperature, bio-oil from pine sawdust pyrolysis with a bubbling fluidized bed reactor was used as sample to investigate properties variation regulation of two groups of bio-oil (No 1 and No 2) stored in 35 days under different storage temperatures (4℃, 27℃, 40℃). FTIR and GC-MS analysis were also conducted pre and post storage under 40℃ on bio-oil No 2. The results indicated that low temperature (4℃) brought about the reduction of water content of bio-oil while normal and high temperature (27℃, 40℃) did the inverse effect. The increase of kinematical viscosity of bio-oil had a close relationship with storage temperature without the disturbance of water. Higher temperature caused greater increase of kinematical viscosity of bio-oil. pH value had a slight variation and no obvious regulation could be found under all three storage temperature. Frequency shifting and variation of light transmittance from FTIR analysis showed that the violent movement of electron on different functional groups intensified the interaction of molecular in bio-oil. GS-MS analysis demonstrated that the composition of bio-oil became more complex because some reactions were catalyzed after 35 days storage under high temperature. Therefore, low temperature has the best effect on controlling the stability of bio-oil

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