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污泥中汞的存在形态及其在干化过程中的动态变化

Speciation of mercury in sewage sludge and its dynamic changes in drying process

关键词：污水污泥 汞 存在形态 干化

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摘要：在测定市政污泥、印染污泥和造纸污泥中汞含量及其存在形态分布特征的基础上，通过模拟实验，系统研究了不同类型污泥中汞存在形态在干化过程中的动态变化，同时分析了污泥中汞含量和各存在形态发生变化的原因.结果表明，市政污泥的汞含量依次大于印染污泥和造纸污泥；污泥中无酸溶态汞和可还原态汞，只存在可氧化态汞和残渣态汞；被试污泥在25~100 ℃干化时，含水率降低不会导致汞的析出；在100~200 ℃干化时，污泥中汞含量随温度的升高呈现出缓慢降低的趋势；当干化温度>200~300 ℃时，随污泥中有机质和硫化物的分解，可氧化态汞消失；当干化温度达到400 ℃时，污泥中汞不复存在.

Abstract：This study analyzed the contents and speciation of mercury in sludge samples from three sources, municipal sewage, printing and dyeing factory and sludge paper mill. Systematical experiments were conducted to investigate the dynamics of mercury in these three types of sludge during the drying process and the factors potentially contributing to speciation processes were also identified. Results showed that the municipal sludge had the highest mercury content while paper mill sludge had the lowest content of mercury. Results confirmed the existence of the oxidizable and residual forms of mercury in the tested sludge samples. The acidic soluble and reducible forms, however, were hardly detected. When the drying temperature was set between 25 ℃ and 100 ℃ with decreasing moisture content, no leakage of mercury was found in our experiments. However, the mercury content in the sludge samples decreased slowly with increasing temperatures ranging from 100 to 200 ℃. Furthermore, oxidizable mercury was removed along with the decomposition of organic matters and sulfide at temperatures between 200 to 300 ℃. Ultimately, when the drying temperature reached 400 ℃, the mercury in the sludge samples were almost undetectable.

Key words：sewage sludge mercury speciation drying process