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长株潭市区近地表灰尘中重金属分布污染研究

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摘要: 在长沙、株洲、湘潭(即长株潭)地区系统采集近地表灰尘样品155件, 用ICP-MS法、聚类分析、相关分析、X线衍射法及尼梅罗综合污染指数法等方法对其重金属的含量、空间分布特征、主要污染物来源及污染程度进行研究。研究表明: 本区灰尘中Cd, Cu, Pb和Zn的平均含量分别为29.93, 149.10, 926.40和1 759.00 mg/kg, 分别是长株潭土壤背景值的57.56, 1.57, 24.31和19.19倍; Cd, Cu, Pb和Zn 污染空间分布特征表现为在株洲、湘潭工业区、长沙及湘潭内环交通繁忙区严重, 尤其是与有色金属生产有关的工业区最为突出; 灰尘中较高的Cu, Cd, Pb和Zn主要源于有色金属工业生产及交通工具的应用; Cd, Pb和Zn平均污染水平达到严重污染级别, 总体污染程度由大至小为Cd, Pb, Zn和Cu; 灰尘中的Cu, Cd, Pb和Zn污染以重度污染和极度污染为主, 在进行城市规划和建设时, 应注意住宅区远离工业区。

关键字: 灰尘; 重金属; 污染评价; 长株潭地区

Heavy metal pollution in dust of Chang-Zhu-Tan city region

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Abstract: 155 dust samples were collected around Chang-Zhu-Tan area, the levels of heavy metals in dust were determined, and the characteristics of spatial distributions and main sources of heavy metals were investigated. Moreover, the pollution assessment of heavy metals was conducted by way of ICP-MS, cluster analysis, correlation analysis and X-ray diffraction analysis. The results show that the average contents of Cd, Cu, Pb and Zn in dust are 29.93, 149.10, 926.40 and 1 759.00 mg/kg, which are 57.56, 1.57, 24.31 and 19.19 times of the soil background values respectively. The dusts are polluted by Cd, Cu, Pb, Zn which are much higher in the industrial estate and busy roads of Changsha and Xiangtan, particularly in industrial estate of non-ferrous metal production. The pollution of Cu, Cd, Pb and Zn is primarily due to the production of nonferrous metals industry and transport applications. The pollution of Cd, Pb, Zn and Cu in this region reaches severe pollution level and the pollution degree from large to small is Cd, Pb, Zn and Cu. Therefore, while working out an overall city plan for this region, residential areas should be away from industrial areas.

Key words: dust; heavy metal; pollution assessment; Chang-Zhu-Tan region

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