

The experimental study on the plasma gasification and vitrification of fly ash and bottom ash

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Fly ash and bottom ash generated from hazardous waste incinerator still belong to hazardous waste, because they contain a lot of heavy metals and dioxins. At present, the main disposal method is landfill, although it has the disadvantages of taking up a lot of lands, producing serious secondary pollution and so on. Plasma gasification and vitrification are one of the cleanest and most efficient technologies to deal with solid waste, and it produces little pollution and can make maximum use of resources. In order to obtain key data for engineering application, fly ash and bottom ash were melted using a plasma furnace of the pilot scale with feeding and discharging continuously. The properties of vitrification, secondary fly ash, and gaseous product were analyzed thoroughly, and the net input power required was also calculated. As the results, the density of the

vitrification was 2.8-3.5 g/cm³ and the leaching results of heavy metals from the vitrification were below the limits (EN 12457/GB 5085.3). The plasma furnace could deal with 300 kg of fly ash and bottom slag continuously, and the net input power was 0.8 kWh/kg. The yield of the secondary fly ash was nearly 7%, and the main components of it were NaCl and KCl. However, there are several urgent problems to solve, such as reducing the energy consumption, extending the service life, dealing with the high content of chlorine and making up the most use of vitrification products.

Biography

Ming Hu obtained his PhD degree in plasma physics from University of Science and Technology of China, China in 2014. He has joined in Everbright Envirotech Ltd, Nanjing, China as a Director of research in 2015. Since 2015 he served as a head of the plasma technology working group at the Everbright Environmental Research Institute, Nanjing, China. He has published seven articles, one book chapter and 20 patents. His publications reflect his research interests and expertise in experimental study of thermal plasma, waste plasma gasification technology and ash plasma melting technology.

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