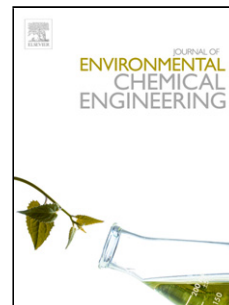


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Synthetic wollastonitic glass ceramics derived from recycled glass and medical waste incinerator fly ash

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Abstract

The present investigation focuses on the production of synthetic wollastonitic glass ceramics (WGCs) through vitrification of medical wastes incinerator fly ash (MFA) with soda lime recycled glass (SLRG) at 1300 °C, followed by re-crystallization in the range of 950 °C. The sintering process was carried out at the final temperature, previously determined by differential thermal analysis (DTA). The raw materials as well as the produced WGCs were characterized by chemical mineralogical and microstructural analyses. Their leaching behavior was evaluated using the EN 12457-2 compliance leaching test. Re-crystallization led to the development of glass ceramics with two major crystalline phases: monoclinic wollastonite (b-CaSiO_3) and gehlenite ($\text{Ca}_2\text{Al}_2\text{SiO}_7$). The compressive and bending strength values varied from 190-194 MPa and 79-82 MPa, respectively. Although MFA exhibited high metals leaching values, indicating a hazardous waste, no trace elements were detected in the leachates of the WGCs.

Keywords: Medical Wastes, Fly Ash, Vitrification, Glass Ceramics

1. Introduction

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