The crystallization kinetics of the MgO-Al₂O₃-SiO₂-TiO₂-Bi₂O₃ glass ceramics system produced from industrial waste

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The MgO-Al₂O₃-SiO₂-TiO₂ glass system was prepared by melting method. The crystallization behavior and crystallization kinetics of a sample with glass ceramic composition were examined. DTA and XRD analysis revealed the crystallization of Ca₀.₉₆₅Mg₂Al₁₆O₂₇ cordierite (Mg₂Al₄Si₅O₁₈) and Fe₂TiO₅ phases. The activation energy for the crystallization of cordierite phase has been evaluated, and the crystallization mechanism has been studied by applying DTA measurements performed at various heating rates. The results indicate that the dominant crystallization mechanism for this system is bulk crystallization dominated by three-dimensional growth. The average calculated values of crystallization and viscous flow for the formation of crystal phases from the glass matrix were measured to be 330 kJmol⁻¹ and 377 kJmol⁻¹, respectively.

Biography
Hüseyin Özkan Toplan has completed his PhD in 1998 from Sakarya University. He has been working at the Sakarya University, Metallurgy & Materials Engineering, as an academic staff since 1990. He has attended more than 35 national and international conferences. He has published more than 30 papers in reputed journals and his publications have been cited more than 150.

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