

The use of the rietveld method to study the phase composition of cordierite (Mg₂Al₄Si₅O₁₈) ceramics prepared from rice husk silica

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Abstrak

This research presents the use of the Rietveld method to study the phase composition of cordierite (MG₂AL₄SI₅O₁₈) ceramics prepared from rice husk silica, after the samples were sintered at 1300, 1400 and 1500 °C. The formation of cordierite is temperature-dependent as indicated by the relative phase composition obtained from x-ray diffraction patterns for the cordierite and spinel increased markedly with increasing temperature, i.e, from 38.98 to 54.15 wt% and from 11.81 to 17.99 wt % following the increase in temperature from 1300-1500 °C, respectively. The above values were obtained with the aid of the Rietveld method, carried out until the goodness of fit values (GoF) reached below 2, which is considered a satisfactory value to reveal the real phase composition. Different plots produced by refinement using the Rietveld method also reveal a reasonable fit between the observed and the calculated plot, demonstrating the usefulness of the method for calculating the quantity of phase composition in the sintering process.