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The use of the rietveld method to study the phase composition of cordierite (Mg 2 Al 4 Si 5 O 18) 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.