

THERMAL INVESTIGATION OF PROPYPHENAZONE-CAFFEINE MIXTURE

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Thermal characteristics of propyphenazone-caffeine mixture were investigated using differential scanning calorimetry (DSC), thermogravimetric analysis (TGA) and Fourier transform infrared (FTIR) spectrometry. Binary mixtures containing various ratios of the compounds were prepared as physical and fused mixtures to study their thermal behaviours by DSC. Melting endotherms obtained from binary mixtures show no eutectic formation. Propyphenazone-caffeine fused mixture samples containing 50-90 mole% caffeine show three endothermic peaks: the first corresponds to the melting of propyphenazone at temperatures from 93 to 96°C, the second is the solid-solid phase transformation of caffeine at 141°C, and the third at a higher temperature corresponds to the melting of caffeine, which varied according to the propyphenazone-caffeine ratio. When the caffeine concentration decreases to the 50% level, the third peak disappears as a consequence of the sublimation of caffeine and its partial dissolving in propyphenazone melt. The thermograms obtained during the heating of physical mixture samples also suggest sublimation of caffeine. The TGA curves of mixture samples show continuous loss of mass in the temperature range of 125 to 400 °C with different onset temperature depending on caffeine concentration in the mixture. The FTIR spectra confirm DSC data since there is no chemical interaction between the two compounds, irrespective of the type of mixtures.