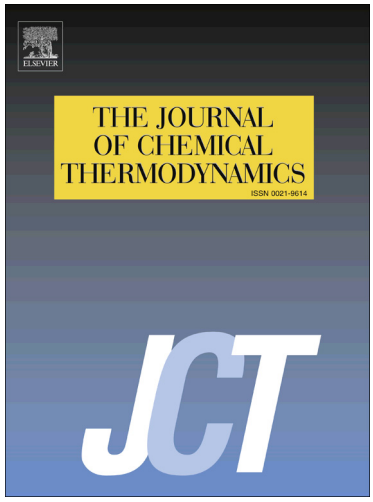

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Evaluation of vaporization enthalpies and liquid vapor pressures of cedrol, nerolidol, and 1-adamantanol by correlation gas chromatography

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Abstract

The vaporization enthalpies and vapor pressures of (+)-cedrol and nerolidol are reported at T = 298.15 K using a series of alcohols as standards by correlation gas chromatography. Vaporization enthalpies at T = 298.15 K of (88.3±1.5, 91.4±1.5, 92.7±1.6) kJ·mol^{-1} were evaluated for (+)-cedrol, Z-nerolidol and E-nerolidol, respectively. Upon injection into the gas chromatograph, (+)-cedrol was partially converted to α- and β-cedrene, identified by GCMS and independent synthesis. Additionally, the vaporization enthalpy of 1-adamantanol evaluated as an unknown and then used as a standard, compared well to the value calculated from the sublimation, fusion and solid-solid phase transition enthalpies previously reported. Liquid vapor pressures of (+)-cedrol, Z-nerolidol, E-nerolidol and 1-adamantanol are also reported as a function of temperature. A vapor pressure of 187.9 kPa is estimated for 1-adamantanol at the fusion temperature and the vapor pressure of solid 1-adamantanol at T = 298.15 K is reproduced within a factor of two of the literature value.

Keywords: Vaporization Enthalpy, Vapor Pressure, (+)-Cedrol, Nerolidol

1. Introduction

Cedrol, also known as (1S,2R,5S,7R,8R)-2,6,6,8-Tetramethyltricyclo[5.3.1.0^{1,5}]undecan-8-ol, is a sesquiterpene alcohol occurring in cedar wood oil from cedar, juniper, and cypress trees [1]. Cedar wood oil has a sweet woody aroma preferred for a variety of fragrance uses in soaps, perfumes, detergents, shampoos, massage oils, and the restoration of furniture. Beyond the cosmetic applications, cedar wood oil is practical for laboratory use as immersion oil, and for