Journal of Thermodynamics & Catalysis
ISSN: 2157-7544
OPEN ACCESS Freely available online
Opinion Article

Quinoline Derivatives Thermodynamic Properties during Phase Transition

Rui Hu*

Department of Materials Science and Engineering, Shaanxi University of Science and Technology, Xi'an, China

DESCRIPTION

Derivatives of quinoline are used extensively in both industry and medicine. Since quinolines have antibacterial properties, they were used in the production of medicines to treat influenza B-Mass virus. Additionally, quinolines are utilised to treat conditions like cancer, malaria, and inflammation. They also include antidotes for poisoning, antidiabetic properties, and HCV antiviral activity. Due to the adaptability of their steric and electrical properties, quinolines were also used for study on magnetic properties, photochemistry, materials science, solution investigations, and homogeneous catalysis as well as electro-optical display systems. Therefore, prior to employing quinolines, thermochemical research on them is crucial. The quality and stability of medications and manufactured devices are determined by the thermochemical characteristics of the fundamental components. Enthalpy, entropy, and Gibbs energy are transferred during a phase transition from a liquid or crystalline state to a gas phase at constant temperature and pressure. It goes without saying that evaporation enthalpy is a feature of chemical thermodynamics that can be determined either directly by calorimetric methods or indirectly by determining how vapour pressure changes with temperature. As a result, solution calorimetry was used to calculate the evaporation enthalpies of different chemicals in particular solvents using values for solution enthalpies and solvation enthalpies. The stability and quality of medications and devices made from chemicals (quinolones in this study) are distinguished by their chemical thermodynamic properties. Especially the enthalpy, Gibbs energy, and entropy of the phase transition thermodynamic characteristics. In this study, the molecules 2-methylquinoline, 2-chloroquinoline, and 2-phenylquinoline had their thermochemical characteristics assessed. The three compounds that are 2-position substituted quinolines at 298.15 K have their evaporation enthalpy measured using solution calorimetry-additivity scheme approach and transpiration method. As a result, the other thermochemical characteristics of the compounds were calculated for the 2-chloroquinoline compound using the transpiration method, and for the other compounds using data from the literature. The stability and the thermochemical energy of the compounds, as well as the effect of substituted groups at the 2-position of the quinoline compound, are established as the chemical thermodynamic character values of the quinolines. As a result, it was possible to determine the stability and quality of the medications and equipment created from the quinolines under study. For each of the examined substances, solution enthalpy was directly calculated using solution calorimetry at 298.15 K. The enthalpy of a substance in its standard condition (solid or liquid) to dissolve in a solvent and produce an infinitely diluted solution under standard pressure and temperature of 0.1 Pa is known as the solution enthalpy. Additionally, the results for the solution enthalpy show that all three compounds exhibit an endothermic reaction when they dissolve in the benzene solvent. The intense interaction with the benzene solvent and its liquid condition contribute to the low value solution enthalpy 2-methylquinoline. At standard temperature and pressure of 0.1 Pa, the term "Solvation Enthalpy" refers to the enthalpy transfer of a substance from the gaseous state to the solvent in the liquid phase. Another chemical thermodynamic property associated with phase transitions, solvation enthalpy describes the solubility impact of a molecule in its solvent. According to an additivity scheme approach, the solvation enthalpy of the three quinolines was measured in this study. The examined compounds' Gibbs energy and phase transition entropy were calculated at 298.15 K.

In general, there were no favourable changes to the Gibbs energy of the phase transition of the compounds from the liquid or crystalline state to the gas phase. Additionally, the molecule 2-Phenylquinoline had a Gibbs energy of 44.3 0.04 kJ.mol^{1}, the highest value, because it had the highest sublimation enthalpy value and was in the most stable crystalline state. The quinoline molecule, which has no substituted groups and is in a liquid state, is responsible for the minimal value of Gibbs energy, which was 13.36 kJ.mol^{1}. Using the solution calorimetry-additive scheme method, the evaporation enthalpy for the substances Quinaldine (2-Methylquinoline), 2-Chloroquinoline and 2-Phenylquinoline was discovered. Additionally, the target compounds' chemical thermodynamic characteristics were estimated, and the values were modified to account for standard temperature.

Correspondence to: Rui Hu, Department of Materials Science and Engineering, Shaanxi University of Science and Technology, Xi'an, China, E-mail: rhu27@nwpu.edu.cn

Received: 28-Apr-2023, Manuscript No. JTC-23-24965; **Editor assigned:** 02-May-2023, Pre QC No. JTC-23-24965 (PQ); **Reviewed:** 16-May-2023, QC No. JTC-23-24965; **Revised:** 23-May-2023, Manuscript No. JTC-23-24965 (R); **Published:** 30-May-2023, DOI: 10.35248/2157-7544.23.14.339

Citation: Hu R (2023) Quinoline Derivatives Thermodynamic Properties during Phase Transition. J Thermodyn Catal. 14:339.