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Kinetic parameters from thermally stimulated dehydration and the relationship to drug-water interactions in pharmaceutical hydrates

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A variety of Active Pharmaceutical Ingredients (API's) can exist as hydrate forms. The conditions that facilitate hydrate formation include factors such as humidity exposure during storage, pharmaceutical processing and dosage forms capable of transferring water to API. It is mainly the thermodynamic water activity of the surrounding medium (solution, vapour phase, etc.) that determines whether a given hydrate structure can be formed. Studies that evaluate hydrate structure and stability will be beneficial to the understanding of hydrate formation and influence on physico-chemical properties. Thermal analysis has been widely used for characterization of pharmaceutical hydrates in terms of structural and stability investigations. For hydrate compounds the use of Thermo-Gravimetric (TG) analysis had explored both isothermal and non-isothermal heating regimes for the investigation of thermally stimulated dehydration kinetic parameters. Knowledge of dehydration kinetic parameters under a controlled heating program offer unique insight to drug-water association as the kinetic information mostly relate to structural features and intermolecular forces operating with the parent anhydrate drug form. This study report findings of dehydration kinetic parameters from two structurally relates macrolide antibiotics in an attempt to correlate observed kinetic behaviour to the structural characterization of the hydrate compounds.

Biography

Driekus Grooff is currently Lecturer of physical chemistry at Nelson Mandela Metropolitan University, Port Elizabeth South Africa. He obtained his PhD in 2010 at North-West University, Potchefstroom, South Africa. His research focuses on solid-state properties and stabilities of pharmaceutical compounds. Collaborative research with the Center of Excellence for Pharmaceutical Sciences at North-West University is currently ongoing. Research outputs in international journals such as *Journal of Pharmaceutical Sciences* and *Thermochimica Acta* have emphasized various aspects of solid-state chemistry and include pharmaceutical technology, analytical and physical chemistry.

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