approach based on the Clapeyron equation and the alternation rule when combined with high-pressure measurements.

Trivedi, M. K. et al. (2017). "In-depth investigation on physicochemical and thermal properties of magnesium (II) gluconate using spectroscopic and thermoanalytical techniques." *J Pharm Anal* 7(5):332–337.

Magnesium gluconate is a classical organometallic pharmaceutical compound used for the prevention and treatment of hypomagnesemia as a source of magnesium ion. The present research described the in-depth study on solid state properties viz. physicochemical and thermal properties of magnesium gluconate using sophisticated analytical techniques like PXRD, PSA, FT-IR, UV-Vis spectroscopy, TGA/DTG, and DSC. Magnesium gluconate was found to be crystalline in nature along with the crystallite size ranging from 14.10 to 47.35 nm. The particle size distribution was at d(0.1) = 6.552 microm, d(0.5) = 38.299 microm, d(0.9) = 173.712 microm, and d(4,3) = 67.122 microm along with the specific surface area of 0.372 m(2)/g. The wavelength for the maximum absorbance was at 198.0 nm. Magnesium gluconate exhibited 88.51% weight loss with three stages of thermal degradation process up to 895.18°C from room temperature. The TGA/DTG thermograms of the analyte indicated that magnesium gluconate was thermally stable up to around 165°C. Consequently, the melting temperature of magnesium gluconate was found to be 169.90°C along with the enthalpy of fusion of 308.7 J/g. Thus, the authors conclude that the achieved results from this study are very useful in pharmaceutical and nutraceutical industries for the identification, characterization and qualitative analysis of magnesium gluconate for preformulation studies and also for developing magnesium gluconate based novel formulation.

Yamashita, M. et al. (2015). "Vapor phase alkyne coating of pharmaceutical excipients: Discrimination enhancement of Raman chemical imaging for tablets." *J Pharm Sci* 104(12):4093–4098.

Raman chemical imaging has become a powerful analytical tool to investigate the crystallographic characteristics of pharmaceutical ingredients in tablet. However, it is often difficult to discriminate some pharmaceutical excipients from each other by Raman spectrum because of broad and overlapping signals, limiting their detailed assessments. To overcome this difficulty, we developed a vapor phase coating method of excipients by an alkyne, which exhibits a distinctive Raman signal in the range of 2100–2300 cm(−1). We found that the combination of two volatile reagents, propargyl bromide and triethylamine, formed a thin and nonvolatile coating on the excipient and observed the Raman signal of the alkyne at the surface. We prepared alkyne-coated cellulose by this method and formed a tablet. The Raman chemical imaging of the tablet cross-section using the alkyne peak area intensity of 2120 cm(−1) as the index showed a much clearer particle image of cellulose than using the peak area intensity of 1370 cm(−1), which originated from the cellulose itself. Our method provides an innovative technique to analyze the solid-state characteristics of pharmaceutical excipients in tablets.