

Abstract

"Study of the solubility of amorphous drugs within polymer matrices via dielectric spectroscopy"

Key words: dielectric spectroscopy, flutamide, solubility, elevated pressure, differential scanning calorimetry.

This work contains the results of systematic research on the solubility limit of a drug dissolved within the polymer matrix, determined utilizing broadband dielectric spectroscopy.

Presented herein isothermal measurements, used to determine the solubility limit of a drug within the polymer matrix, carried out at both atmospheric and elevated pressure, are currently the only experimental alternative to the calorimetric measurements. Dielectric spectroscopy has already developed and well-established high-pressure set-ups that allow to determine the effect of increased pressure on the said solubility in the range not available for calorimetric measurements. As a result of performed studies, it was proved that the consequence of the increased pressure (at a constant temperature) is a reduction in the amount of drug (flutamide - FL), that can be dissolved in a polymer matrix (Kollidon VA64® - PVP/VA).

An additional advantage of dielectric measurements is the ability to easily and rapidly determine the capability of the various polymer matrices (e.g. polyvinylpyrrolidone (PVP), vinyl acetate (PVAc) and PVP/VA) to dissolve amorphous drug (FL), during non-isothermal measurements. However, the non-isothermal measurement discussed herein should be treated as a qualitative rather than a quantitative method. Obtained results demonstrate the following dependence: PVP > KVA > PVAc. This indicates that the largest amount of FL can be dissolved in the PVP matrix and the smallest in the PVAc.

Our studies confirmed that the FL concentration in the PVP/VA matrix, determined during both non-isothermal and isothermal measurements, is stable, at room temperature, for a minimum of 4 years.