

192. Title: Terahertz In-Line Sensor for Direct Coating Thickness Measurement of Individual Tablets During Film Coating in Real-Time

Author: May, RK; Evans, MJ; Zhong, SC; Warr, I; Gladden, LF; Shen, YC; Zeitler, JA

Source: JOURNAL OF PHARMACEUTICAL SCIENCES

Volume:100

Issue:4

Pages: 1535-1544

Publication year: 2011

Document type:Journal article (JA)

Abstract: We present a new in-line measurement technique to determine the coating thickness of individual pharmaceutical tablets during film coating in a pan coating unit using pulsed terahertz technology. Results of these real-time terahertz measurements acquired during a production scale coating run are validated using both off-line high-resolution terahertz pulsed imaging of the whole dosage form as well as weight-gain measurements made on sample tablets removed at discrete time intervals during the process run. The terahertz measurements provide a direct method of determining the coating thickness, and no chemometric calibration models are required for the quantification. The results, and their repeatability, demonstrate that real-time monitoring of pharmaceutical tablet coating is not only possible but also provides substantially more information of the coating quality than the standard quality control method. Rather than providing the average coating thickness of a large number of tablets, the terahertz sensor provides the thickness of up to 100 individual tablet coatings per minute. Using this information, the operator can get additional information about the thickness distribution in the coating pan and adjust the process accordingly. At present, a minimum coating thickness of 40 : m is required to determine the coating thickness. The technique is applicable for coatings up to 1 mm in thickness. Within that range, it provides thickness measurements of sub-micron resolution. Terahertz in-line coating process measurements show considerable potential for applications in real-time release, process analytical technology and quality by design.