In-Situ Measurement of Sulfamerazine Phase Transformation using Quartz Crystal Microbalance

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A unique new technique for in-situ monitoring the phase transformation of active pharmaceutical ingredient such as sulfamerazine(SMZ) was developed using QCM (quartz crystal microbalance). For the prevention of the SMZ crystal nucleation on the QCM sensor surface, the hydrophobic gold surface obtained by self-assembling with 1-dodecanethiol was used in present study. The inhibition of electron transfer from the gold surface shown by cyclic voltammetry indicated that the dodecanethiol layer was well self-assembled on gold surface of the QCM sensor. Due to the solution condition change during the phase transformation of SMZ, there occurred the decrease of frequency and increase of resistance. At the same time, the phase transformation process was monitored by off-line Raman spectroscopy, and it showed high consistency with the measurement by QCM. The phase transformation was also confirmed by the morphological change of the SMZ crystals monitored with scanning electron microscopy.