New application of QCM:monitoring the on-set of nucleation and solubility curve determination

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Various kinds of interactions on the QCM (Quartz Crystal Microbalance) sensor surface has been studied in the last decade, such as lamgmuir films, monolayers, solid-liquid interface, either in gas or liquid phase. We studied QCM in two combined phase suspension. The formation of solid particles in liquid phase was monitored by QCM, which is on-set of nucleation in cooling crystallization. In the reversed process, the disappearance of solid phase when slowly heated was also caught by QCM, use which we draw the solubility curve.

We chose sulfamerazine, a classic API (Active Pharmaceutical Ingredient) as the model material. Through measuring the MSZW (meta stable zone width), compared with FBRM, the QCM is proved to be of high accuracy to measure the on-set of nucleation. In the case of determination of solubility curve, QCM is even more accurate than FBRM.

We successfully measured the on-set of nucleation and draw solubility of sulfamerazine using QCM in the batch system, and this application could be easily turned to real industry production monitoring.