International Fine Particle Research Institute

Project Brief

Imaging and Modeling of Powder Compact Disintegration and Dissolution

Many consumer products supplied by the pharmaceutical, agricultural, food, materials, and personal care industries are consolidated powders (e.g. tablets, pellets) whose performance depends on their "dissolution" in a liquid medium. Dissolution, or more accurately the release of one or more components in the compact into the liquid medium, is a complex result of liquid infiltration, disruption of the compact microstructure through swelling and/or disintegration, and in many cases dissolution of one or more constituent components of the compact.

The dissolution rate of compacts is commonly measured by monitoring the concentration of the "dissolving" species in the liquid medium. This measurement is sufficient for quality control purposes, but it is less helpful in product design or troubleshooting situations.

IFPRI wishes to fund a project that applies modern time-resolved 3D imaging methods, such as optical coherence tomography or μ-computed tomography to study at the pore level tablet dissolution and to use this detailed information to develop pore-scale and continuum models linking structure to liquid imbibition, swelling, delamination, and erosion.

There is no restriction on the model systems investigated other than to validate the analytical and modeling methodologies with a range of materials and structures.