

CA 18112 Mechanochemistry for Sustainable Industry
STSM title: The application of Mechanochemical treatments for thermomechanical activation of surfaces
on the crystalline heterogenous solids

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Abstract of lecture:

Study on the correlation of mechanochemical treatment of solid powdered mixtures of two different classes of drugs on the propensity to cocrystallize their components into multicomponent crystalline single phases (drug-drug cocrystal), or amorphous or liquid crystalline phases that are of life science relevance (pharmaceutical, food, agrochemical, environmental protection etc.).

The project's concept encompasses investigation the relationship between the process parameters (performance of powder mixing, temperature, time for treatment) and formulation parameters (molecular structure, degree of crystallinity or/amorphous, polymorphic forms, molar ratio of the components, type of wetting agents). The screening approach relates to how the performing of the mixing powder mixtures, both within the different type of equipments (ball and chopper mixer) and manual grinding (mortar with pestle) influence the conversion of the different component into the new unique solid phases toward the process of cocrystallization. Furthermore, the thermodynamic and kinetic study on the new multicomponent systems reveals the phase stability during the processing and different ambient conditions.

The crystal structure of the selected model, molecular salt metformin diclofenac for optimizing the mechanochemical method of its preparation, was previously determined by single-crystal XRD techniques and the results are in process of publication (A.Cvetkovski & P.Gilli, V. Bertolasi)