Library of Rubbable and Rubbing Materials for obtaining Nanostriped Two-Dimensional Sheets, Nanostructures and Nanocomposites by the Surface Rubbing Method

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Here, we report pioneering research on creating comprehensive library of rubbable and rubbing materials (bulk and low-dimensional) consisting of a few tens of inorganic (with different crystal systems) and organic materials. Inorganic materials include carbonaceous and non-carbonaceous crystalline and amorphous materials, while organic materials comprise non-living and living materials.

In the library the materials are classified by taking into account their chemical composition and physical properties focusing on their crystal structures, as well as mechanical and surface properties.

The library was created by mechanically rubbing layered and non-layered bulk and nanosized materials (inorganic, inorganic-organic and organic powders) with two substrates with ultra-flat to rough (non-porous, porous) surfaces by Surface Rubbing method [1-5].

Unique nanomaterials with complex architectures and tailored functionalities and nanostructures are obtained, such as:
- Self-assembled 2D nanostripes with tunable sizes, shape, distribution density and surface morphology,
- Pure and composite nanostriped 2D sheets,
- Mixed-dimensional nanostriped nanocomposites,
- Nanoengineered nanostructures with different architecture and surface morphology.

Moreover, the Surface Rubbing method allows fabricating nanostriped heterostructures and 2D devices based on nanostriped nanomaterials. These novel nanostriped nanomaterials and nanostructures offer novel characteristics and lead to a wide range of potential applications.

Besides, a nanoscale phenomenon enabling materials exhibit extraordinary and unprecedented properties and behaviour at the nanoscale, driving advances across multiple fields has been discovered by us.

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