



CMCC Mechanochemistry Discussions

Online Seminar Series

Expanding the Reactivity of Metal Oxides Through Mechanochemical Activation

Livestreaming at
10:00 AM (CT)
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on the CMCC YouTube Channel:

<https://www.youtube.com/channel/UC7eCYPKbGTKpgO7W2bNABxg>



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Metal oxides are often considered chemically inert, yet they play a central role in modern technologies ranging from battery electrodes to heterogeneous catalysts. Conventional synthesis routes are typically based on high-temperature treatments that drive the materials toward thermodynamic equilibrium. In contrast, mechanochemistry opens up previously unknown reaction pathways, thereby enabling the synthesis and activation of these otherwise robust oxides under conditions far from equilibrium. High-energy ball milling, for example, enables the simple preparation of metal oxides in unusual or mixed oxidation states. Furthermore, carefully controlled mechanochemical processes can produce metastable phases or materials with a high defect concentration, whose reactivity surpasses that of their conventionally prepared counterparts. In this talk, I will discuss representative oxide systems—including TiO_2 , Mn_xO_y , and V_xO_y —to illustrate how mechanochemical methods broaden chemical reactivity and unlock new properties in these widely used materials.



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