

# Liquid phase sintering an instrument of nanostructured materials architecture.

*Tuesday, 1 September 2026 09:00 (30 minutes)*

The comparison of traditional high-temperature liquid phase sintering and advanced low-temperature cold sintering processes will be discussed in the frame of new materials science paradigm and non-equilibrium thermodynamics.

At present, two big parts of materials science exist: hard-bonded materials (with bond's energy higher than 1 eV) and soft-bonded materials (with bond's energy less than 0.1 eV). The convergence of these two energy scales is more than a trend; it is the cornerstone paradigm of Materials Science. The New Paradigm treats the "soft" phase not as a secondary filler, but as a structural director and energy dissipator.

The "Hard" world such as ceramics, metals, and semiconductors is driven by enthalpy, processed at high temperatures. The "Soft" World includes polymers, liquids, and biological systems is driven by entropy and weak intermolecular forces such as Van der Waals, hydrogen bonding, processed at room temperature.

The paradigm represents a breakthrough in materials that self-assembled into complex 3D architectures that are thermodynamically impossible to reach via traditional melt-processing or hot liquid phase sintering. The CSP is the perfect manifestation of this statement. "Soft" chemistry of a solvent to reorganize "Hard" inorganic particles at near-ambient conditions.

If convergence is the "meeting" of two worlds (strong and weak bonds), then divergence is the explosive expansion of the state space made possible by that encounter.

## Professional Status of the Speaker

Senior Scientist

## Interest in submitting a paper in a special issue of

Journal of the European Ceramic Society (Elsevier)

## Invitation letter for visa

Yes

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