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Low-power minute-scale sintering of complex parts

The growing demand for agile manufacturing of technical components—particularly in small series—calls for sintering solutions that are fast, flexible and energy-efficient, while remaining economically realistic.
We present a patented current-assisted sintering approach developed at BCRC (WO2025/099305 A1). The process relies on resistive heating of a graphite powder bed in which the part is embedded. This configuration enables minute-scale thermal cycles, reaching sintering temperatures up to ~1600 ℃ within a few minutes, without external pressure, and with very low electrical power (typically a few hundred watts).
Process capabilities are illustrated through an in-depth study on cemented tungsten carbide (WC–Co), a benchmark material for high-performance tooling. We discuss parameter optimisation and the resulting properties (relative density and mechanical behaviour), benchmarked against industrial standards from conventional sintering routes. In particular, WC–Co parts produced by extrusion and densified with this method achieved ~99% relative density with a ~7-minute sintering time.
Beyond material performance, the approach supports direct densification of complex geometries, enabling near-net-shape parts and reducing or avoiding post-machining—an important lever for cost and lead-time reduction. Compatibility with multiple material families (ceramics and metals) will be shown through representative examples.

Professional Status of the Speaker

Senior Scientist

Interest in submitting a paper in a special issue of

No interest

Invitation letter for visa

No

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