



# Computational Thermo-Fluid Dynamics: In Materials Science and Engineering

*Petr A. Nikrityuk*

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# Computational Thermo-Fluid Dynamics: In Materials Science and Engineering

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## **Computational Thermo-Fluid Dynamics: In Materials Science and Engineering** Petr A. Nikrityuk

Combining previously unconnected computational methods, this monograph discusses the latest basic schemes and algorithms for the solution of fluid, heat and mass transfer problems coupled with electrodynamics. It presents the necessary mathematical background of computational thermo-fluid dynamics, the numerical implementation and the application to real-world problems. Particular emphasis is placed throughout on the use of electromagnetic fields to control the heat, mass and fluid flows in melts and on phase change phenomena during the solidification of pure materials and binary alloys. However, the book provides much more than formalisms and algorithms; it also stresses the importance of good, feasible and workable models to understand complex systems, and develops these in detail.

Bringing computational fluid dynamics, thermodynamics and electrodynamics together, this is a useful source for materials scientists, PhD students, solid state physicists, process engineers and mechanical engineers, as well as lecturers in mechanical engineering.

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