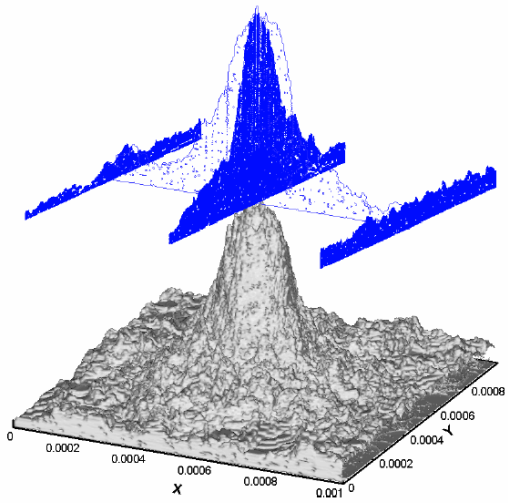
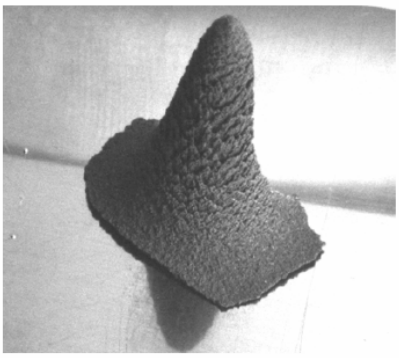
SimCoat

SimCoat is a unique software tool for modeling the spray coating on the surfaces and provides valuable information such as thickness, roughness and porosity for different coating process.

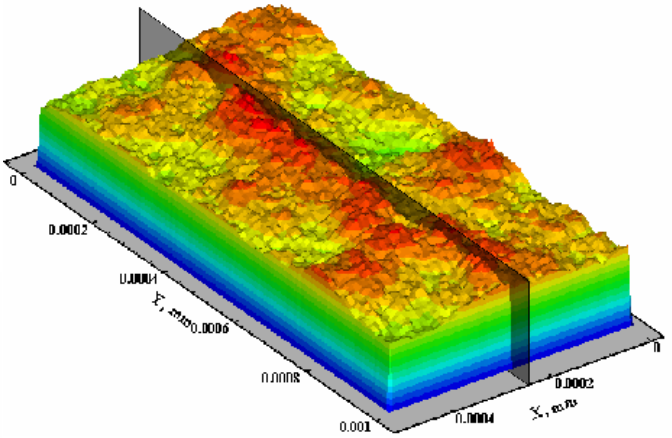


(a)



(b)

Deposition of nickel particles in plasma spray by a spray gun held stationary over the substrate. (a) Simulated by SimCoat; (b) micrograph image.



Simulation of a 1000 x 500 microns of nickel deposit formed by a spray gun moving with constant velocity of 0.2 m/s in x-direction over a flat surface.

- **SimCoat** calculates the coating layer thickness, roughness, and porosity at any desired location on the substrate for a stationary or a moving gun.
- **SimCoat** calculates the initial velocity, diameter and temperature for each injected particle, given the average and standard deviations for these parameters.
- **SimCoat** can also import the measured data from a DPV2000 system for initial diameter, velocity, and temperature of the injected particles.
- **SimCoat** can be used for modeling the metallic and ceramic coatings.

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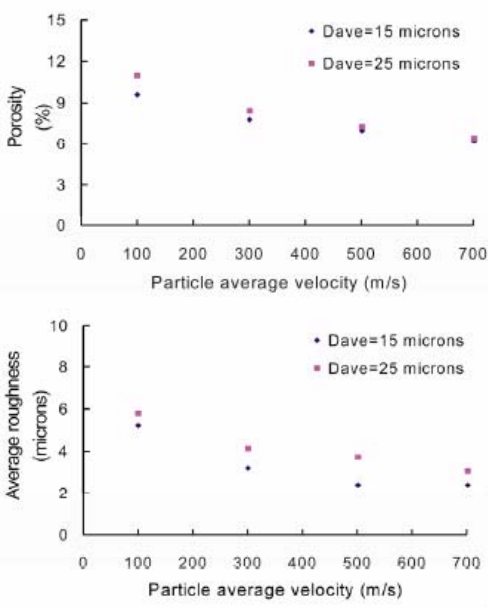
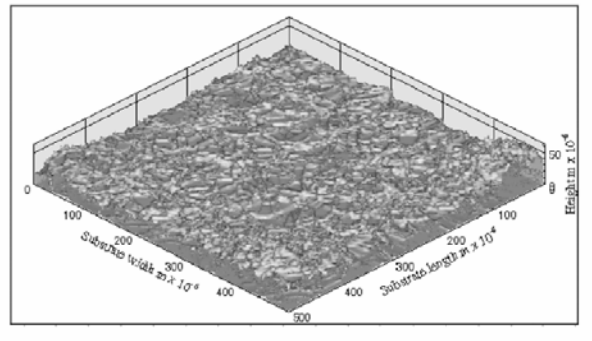
Applications & Features

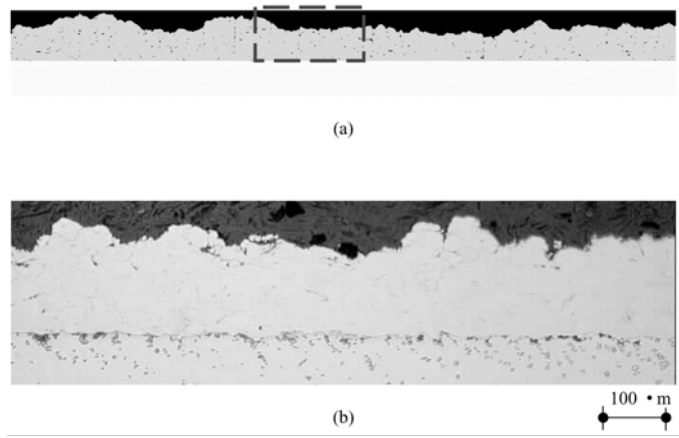
- Analyze and develop various types of liquids and molten metals for coating applications.
- Determine optimal parameters and characteristics such as droplet velocity, size distribution and temperature of the liquid and the substrate.
- **SimCoat** has models for calculating the porosity in the coating layer caused by:
  - *unfilled cavities,*
  - *splat cur-up,*
  - *un-melted particles,*
  - *satellite droplets*
- **SimCoat** comes with a library of drop splat shapes which are used to form the coating.
- **SimCoat** can be coupled with a publicly available post processing tool called **OOF** (a finite element analysis of microstructures software developed by NIST) for determining thermal stresses in the coating layer.



Variations of coating porosity (top) and average roughness (bottom) with particles' average velocity at two different particle's size.



Deposit formed by a spray gun moving with constant velocity over the substrate.



Cross sectional views for (a) SimCoat simulated image of the nickel coating microstructure in which spray gun moves with constant velocity of 0.2 m/s. (b) SEM micrograph of nickel coating on stainless steel (AISI 316) material using HVOF process.

Accurate, Reliable and Precise

- The simulation results by **SimCoat** have been extensively tested and validated through experimentation under various conditions and parameters.
- **SimCoat** is fast and can simulate the coating process for a substrate of 1x1 cm in a matter of few hours on a PC.

About Simulent

Simulent Inc., a Toronto based engineering and consulting company, provides a Computational Fluid Dynamics (CFD) software and related services to industries involved in the design, development and utilization of various types of nozzles, spray atomizers, filling systems and various types of coatings.