



**University
of Victoria**

Graduate Studies

Notice of the Final Oral Examination
for the Degree of Doctor of Philosophy

of

MAXYM RUKOSUYEV

BEng (University of Victoria, 2012)
Specialist (Simferopol State University, 1997)

“Atomization Based Dual Regime Spray Coating System: Design and Applications”

Department of Mechanical Engineering

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10 A.M.
Engineering Office Wing
Room 230

Supervisory Committee:

Dr. Martin Jun, Department of Mechanical Engineering, University of Victoria (Co-Supervisor)
Dr. Colin Bradley, Department of Mechanical Engineering, UVic (Co-Supervisor)
Dr. Zuomin Dong, Department of Mechanical Engineering, UVic (Member)
Dr. Alexandre Brolo, Department of Chemistry, Uvic (Non-Unit Member)

External Examiner:

Dr. Johnson Samuel, Aerospace and Nuclear Engineering, Rensselaer Polytechnic Institute

Chair of Oral Examination:

Dr. Dean Karlen, Department of Physics and Astronomy, UVic

Abstract

In modern research and industrial applications, the importance of coatings can hardly be underestimated. Coatings are used extensively in optics, biomedical applications, manufacturing of cutting tools, and solar panels to name a few. The primary purpose of any coating is to alter surface properties of the base material thus adding new functionality or improving the performance of the original part. A multitude of coating techniques has evolved over the years with spray coating being one of the more widely used. Some applications require deposition of materials that are either in the form of a solution or suspension. Therefore, before or during the deposition process small droplets of the said liquid are formed and transferred onto the substrate. Since differently sized droplets have different surface impact dynamics, droplet velocity at the impact plays an important role in the way it will adhere to the surface. Most spray coating techniques do not take into account the process of droplet-surface interaction which may result in overspray, poor coating thickness control, and material waste.