



TECHNOLOGICAL EDUCATION INSTITUTE OF
CENTRAL MACEDONIA
SCHOOL OF TECHNOLOGICAL APPLICATIONS
DEPARTMENT OF MECHANICAL ENGINEERING

Graduate Studies Program:
Academic Year 2014 - 15

**"Renewable Energy Systems: Design,
Development and Optimization"**

Associate Professor K.G. Anthymidis

Subject:

Production and characterization of hard Boride coatings on metallic substrates.

Introduction & Motivation:

Many metallic materials are used in Renewable Energy Systems. One of these is Titanium (Ti) and its alloys, especially with Aluminum (Al). These alloys are attracting considerable attention because of their potential use as low-density and high temperature structural materials for the construction of modern renewable energy power plants, such as wind generators. However, their inadequate wear and oxidation resistance at elevated temperatures limits their practical applications. The aim of this thesis is to improve the oxidation and wear resistance of Titanium alloys and other metallic materials by thermochemical diffusion processing such as boronizing in fluidized beds, which is a flexible and low cost method, yielding boride layers of excellent quality and uniformity.

Implementation & Means:

Fluidized Bed Chemical Vapor Deposition (C.V.D.) Reactor System. There is one working in the Materials Laboratory of the Mechanical Engineering Department of the Technological Educational Institute of Central Macedonia.

References:

- 1) J.R. HOWARD, "Fluidized Bed Technology Principles and Applications", Publisher: Adam Higler, Bristol and New York, Year: 1989.
- 2) C.K. Gupta, D. Sathiyamothy, "Fluid Bed Technology in Materials Processing", Publisher: CRC Press, Boca Raton, Year: 1991.

Requirements: Good knowledge of English.