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Magnetron sputtered TiO_x layers: structural, electrical, optical and thermochromic aspects

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Abstract

Titanium oxide layers were prepared by sputter deposition with plasma emission monitoring in the whole stoichiometry range between Ti and TiO_2 without and with substrate heating to 240 °C. The layers were characterized with regard to their crystal structure and specific resistance. Optical constants were determined in the spectral range between 240 nm and 38 µm. The thermochromic behavior of a prepared Ti_2O_3 layer was measured and compared to calculations for bulk material.

Keywords

solar thermal collector; titanium oxide; thermochromic absorber

1. Introduction

Sub-stoichiometric titanium oxides and oxynitrides are used as absorber materials for solar thermal collectors [1]. But although a variety of thin film deposition techniques have been reported for the