

# **Photocatalytic properties of thin ZnO films deposited by plasma-enhanced atomic layer deposition**

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## **Abstract**

Atomic layer deposition (ALD) is a sophisticated thin film synthesis technique that enables precise control of film thickness, complete coverage of the substrate, and high film quality. Different structural and physical properties can be obtained by varying the synthesis parameters, primarily the substrate temperature [1,2]. For a conventional (i.e. thermal) ALD, the synthesis temperature for high quality ZnO films ranges between 120 °C and 200 °C, and the best photocatalytic activity is obtained for films deposited at above 150 °C [2]. For this reason, this technique is not suitable for deposition on biological and organic substrates. In contrast, an advanced variant of the conventional ALD, plasma-enhanced atomic layer deposition (PEALD), allows deposition at lower temperatures without compromising film quality and growth rate. Moreover, the photocatalytic activity of ZnO films deposited at 80 °C using PEALD is about ten times higher than the photocatalytic activity of ZnO films deposited at the same temperature using ALD [1]. In addition, PEALD allows deposition even at room temperature [3], which makes it suitable for temperature-sensitive substrates and thus opens up many other possible applications. In this seminar, I will present our recent results on PEALD synthesis and characterization of ZnO thin films and their application in photodegradation of organic dyes.

**Keywords:** photocatalysis, thin films, plasma-enhanced atomic layer deposition, zinc oxide

## **References:**

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