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## Atomic layer deposition of aluminum oxide on modified steel substrates

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### Abstract

Al<sub>2</sub>O<sub>3</sub> thin films were grown by atomic layer deposition to thicknesses ranging from 10 to 90 nm on flexible steel substrates at 300 °C using Al(CH<sub>3</sub>)<sub>3</sub> and H<sub>2</sub>O as precursors. The films grown to thicknesses 9-90 nm covered the rough steel surfaces uniformly, allowing reliable evaluation of their dielectric permittivity and electrical current densities with appreciable contact yield. Mechanical behavior of the coatings was evaluated by nanoindentation. The maximum hardness values of the Al<sub>2</sub>O<sub>3</sub> films on steel reached 12 GPa and the elastic modulus exceeded 280 GPa.

**Keywords:** atomic layer deposition; nanoindentation; steel; aluminum oxide; hardness; insulators

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