

Focus on **characterization of the photocatalytic effect** (Methylene Blue (MB) and electrochemical methods) as well as Microstructural characterization of TiO₂ films (XRD, Raman, GDOES, SEM, AFM, TEM).

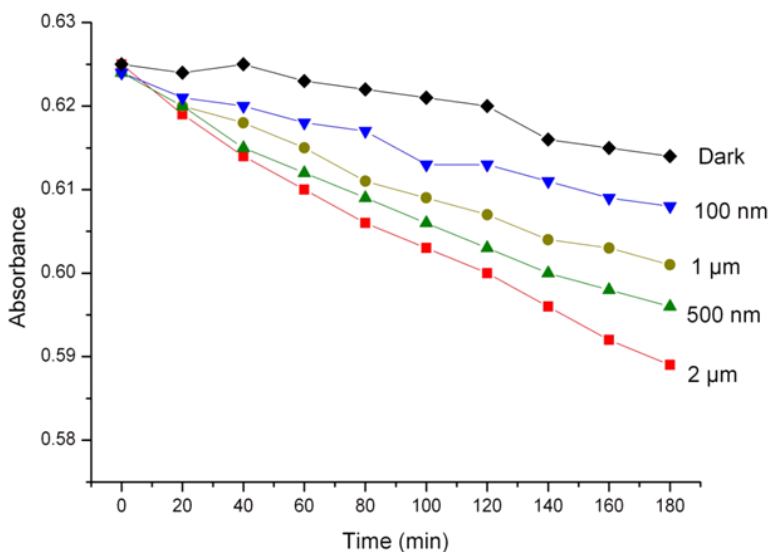
Methylene blue decomposition and OCP (**O**pen **C**ircuit **P**otential) showed surprising results in terms of the coatings thickness and photocatalytic activity (sorted from least to most active). At first glance it was surprising that **500 nm is more active than 1 μm**:

- 100 nm least active
- 1 μm
- 500 nm
- 2 μm most active

RESULTS



Photocatalytic Activity

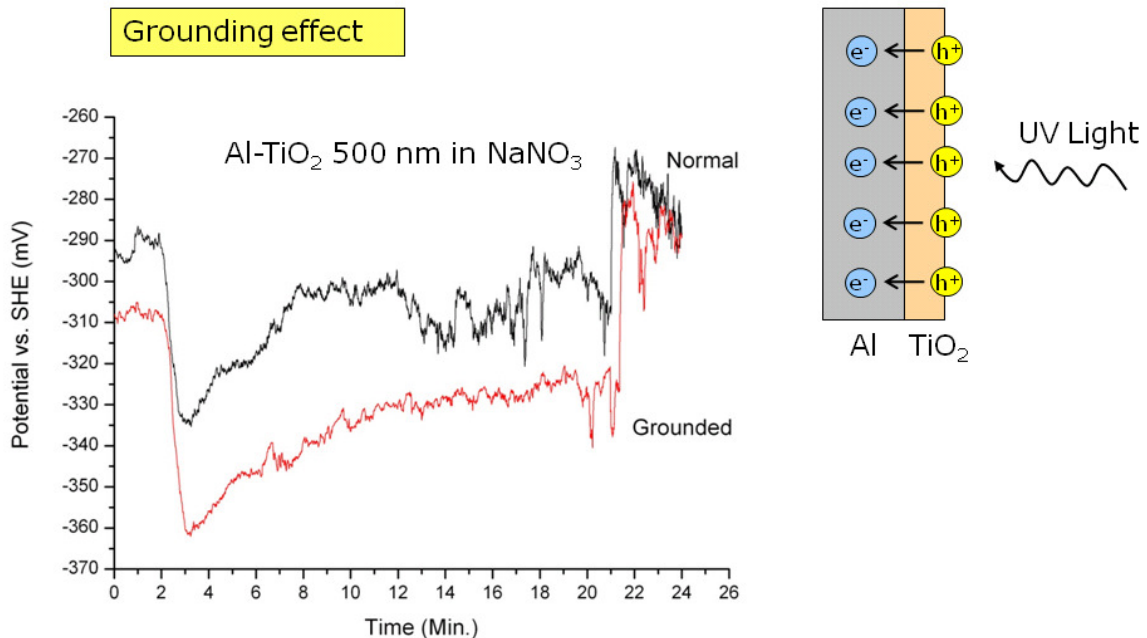


- According to DIN 52980
- No change in decomposition rate
- Effect of volume

The result is partially explained by the 'relative thickness' off the coatings, where the '1 μm'-coating is almost having the same thickness as the '500 nm'-coating (GDOES results).

OCP tests showed that sample grounding increases the photocatalytic effect.

Newest results: OCP



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Svava presented summary of her master thesis, which amongst other contains SEM, XRD, GDOES, AFM, optical measurements (transmission and reflectance) and electro cell measurements. Amongst the most interesting findings were:

- Increasing the surface area results in more photo catalytic activity
- Rough surface results in more interaction of metallic substrate and TiO₂
- Various substrates for the surface create different band gabs

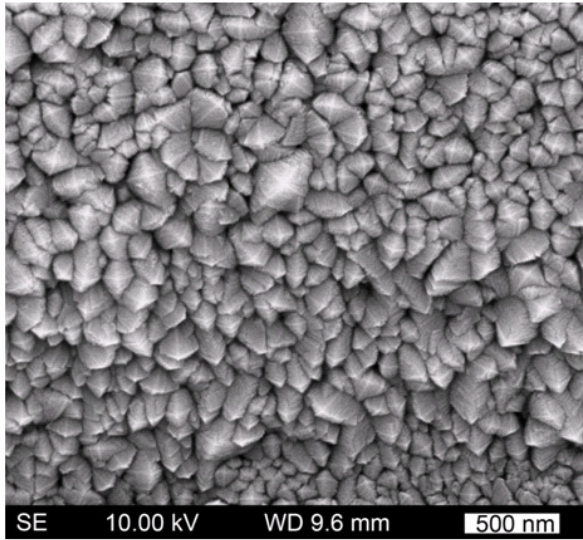
Regarding the last finding, it created an interesting discussion, whether **doping of aluminum, copper and steel can reduce the band gap and shift the wave length reactivity into the visible area**. It appears as if different substrates cause different band gaps in the overlying TiO₂ layer. This also created discussions on whether this shift would reduce activity.

The feather like columnal structure of deposited TiO_2 varies with the thickness of the layer:

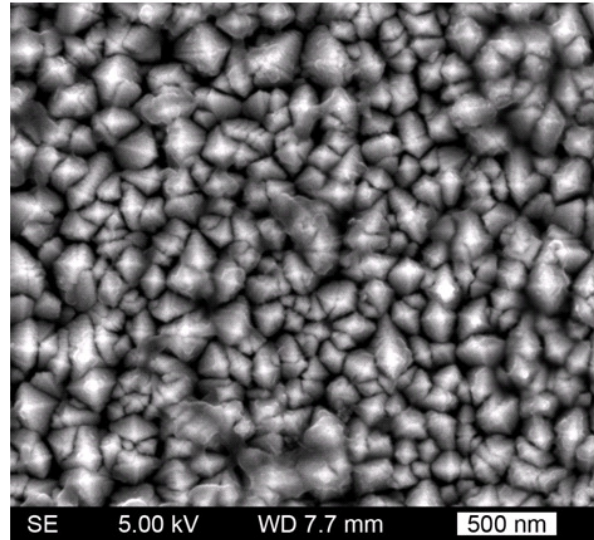
RESULTS



SEM



1 μm



2 μm

- Column size increases with thickness