

# Room temperature laser-assisted on-demand crystallization and micropatterning of amorphous TiO<sub>2</sub> films

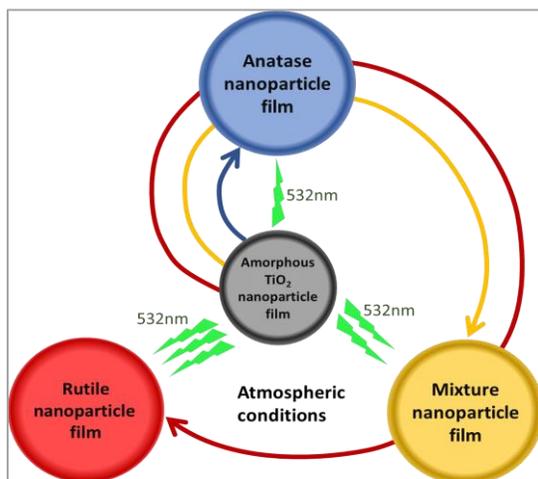
École de Technologie Supérieure, ETS-104

## BACKGROUND

Titanium dioxide is a material that possesses ubiquitous properties that are advantageous in several fields from water cleaning, production and transformation of energy and surfaces modification. From research to industrial applications, the ability to include thin layers of crystalline TiO<sub>2</sub> without involving high temperature or additional chemical processes is a pivotal point to expand the market of this material.

## TECHNOLOGY

A process has been developed for the production of an amorphous Titanium dioxide ink that can be printed or deposited in thin films, making it compatible with several optoelectronic and chemical applications. In order to trigger crystallization of this TiO<sub>2</sub> film in the anatase, rutile or mixed form, only a low power laser source is required, and no further heating or doping is necessary.



Schematic process for crystallization of amorphous TiO<sub>2</sub> ink

## COMPETITIVE ADVANTAGES

-In standard processes the amorphous TiO<sub>2</sub> film has to be submitted to a temperature of 450 °C to transform the TiO<sub>2</sub> into the anatase phase and to 800 -1100 °C to reach the rutile phase.

-In this invention the transformation from amorphous phase to crystalline phase (anatase or rutile) is done with a low power laser exposure at 532 nm **at room temperature and normal atmosphere**, thanks to the special properties of this amorphous TiO<sub>2</sub> ink.

## APPLICATIONS

This TiO<sub>2</sub> ink can be used as part of:

- semiconductor production
- solar cells fabrication
- sensors fabrication
- photocatalysis applications

## TECHNOLOGY DEVELOPMENTAL STAGE

Samples of the amorphous Titanium dioxide ink have been fabricated and tested in small volumes.

A scale up process is now under development for multi liter production.

## BUSINESS OPPORTUNITY

Patent pending technology available for partnering or licensing opportunities

## FOR INFORMATION PLEASE CONTACT:

Nadia Capolla, Ph.D.  
Director – Business Development  
Phone: 514-840-1226 # 3010  
E-mail: ncapolla@aligo.ca