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center za prenos tehnologij in inovacij  
na Institutu "Jožef Stefan"

# Licensing opportunity

New era of lubricants decreasing friction coefficient for 60 % and wear coefficient for more than 90 %.

## Field of use

Lubricants, MoS<sub>2</sub> nanotubes, friction and wear properties of materials.

## Current state of technology

The technology has been demonstrated and tested in laboratory. Technology is ready to be licensed out.

## Patent status

Patent granted in USA and EU countries: Germany, France, United Kingdom, Italy.

## Publication

TBA

## Developed by

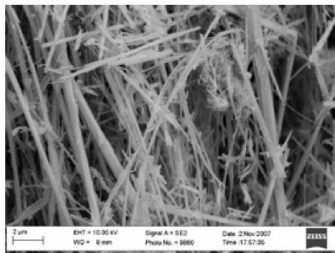
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## Background

Inorganic solid lubricant molybdenum disulfide (MoS<sub>2</sub>) is known lubricant, which has been applied extensively for decades. The easy mutual gliding of MoS<sub>2</sub> layers along (100) basal planes, and surface inertness of MoS<sub>2</sub> give it its low friction properties.

The MoS<sub>2</sub> in usual plate-like form is widely used as a dry lubricant or an oil or grease additive. Unfortunately, the high-hardness edges of crystal layers are prone to oxidation, which reduces the efficiency of lubrication, especially in humid environment. Thin flakes with high active surface and with a relatively low number of unsaturated bonds at edges are therefore preferable.

## Description of the Invention

The knowledge of MoS<sub>2</sub> platelets as additive for friction reduction and recent discoveries of new morphology of MoS<sub>2</sub>, in a form of nanotubes, have opened the route of a new lubricants with significant higher anti-friction protection.

## Main Advantages

- Spontaneous partial exfoliation of the nanotubes, which enables effective covering of the contact surfaces.
- This surface coating reduces friction.
- Surface acts anticorrosive due to temperature reduction at the interface.
- Friction reduction is much larger in comparison with the standard MoS<sub>2</sub> platelets.
- The MoS<sub>2</sub> nanotubes can replace toxic extreme pressure additives in oils and greases.
- The MoS<sub>2</sub> nanotubes can be easily mixed into polymers for use as self-lubricative coatings.