

## New catalyst for the fight against smog

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Credit: Tomsk State University

TSU chemists are creating a fundamentally new silver catalyst to purify the air, capable of decomposing toxic carbon monoxide, formaldehyde



and other harmful volatile substances into harmless components. This nanostructure catalyst may be effective even at room temperature and could be used as a filter for ventilation.

"Silver catalysts are less studied than other catalysts made with particles of precious metals—gold, platinum, and palladium. However, they can be just as effective in the oxidation of harmful <u>volatile substances</u> and cheaper by a factor of 10," said Gregory Mamontov, senior researcher at the Laboratory of Catalytic Research.

The fundamentally new approach uses nanostructured materials. The researchers have synthesized a particular type of silica gel—SBA-15, which consists of 6-10 nm diameter nanotubes of silicon oxide, and used it as a basis for preparing the catalyst.

"Each nanotube is used as a nanoscale reactor. Inside, we conduct the synthesis of <u>silver particles</u> and <u>cerium oxide</u> smaller than 3 nm. After that, each nanotube with particles becomes the catalyst. Our task is to distribute the particles inside the nanotubes and to organize special interactions between them that will provide a high catalytic activity in the oxidation of <u>harmful substances</u>. It is assumed that the catalyst obtained in the form of powder or granules can be put into air-cleaning devices in homes, offices or production halls. In this case, it is not necessary to heat it, because this catalyst, in contrast to many analogs, is active and stable at <u>room temperature</u>," said Mamontov.

The scientist added that this catalyst will primarily be effective against carbon monoxide and formaldehyde, but can also degrade other harmful, volatile substances into harmless components.

"First of all, such a catalyst will be in demand in industrial areas and cities to fight industrial emissions and smog from forest fires, which also contains a large amount of <u>carbon monoxide</u>. In addition, the catalyst can



be adapted to neutralize the gas discharges of chemical plants and the exhaust systems of automobiles," said Mamontov.

Provided by Tomsk State University

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