

Researchers design catalysts with nanotechnology to reduce vehicular pollution

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Maya Mexican oil type has up to 30 parts per million of sulfur, labeling it as heavy oil, meaning, too pollutant for the environment when used as raw material for fuels. Looking to reduce the national hydrocarbon emissions, a team of scientists from the Center of Nanosciences and Nanotechnology (CNyN), from the National Autonomous University of México (UNAM), has created a catalyst for the oil industry.

Currently, they have developed two types of nanocatalysts according to the requirements of Pemex in its process of [sulfur](#) removal, from the area of refinement, with which reducing gasoline and diesel to having only 10 parts per million of sulfur has been achieved, as according to international regulation.

This is pointed out by Sergio Fuentes Moyado, head of project and director of CNyN at UNA, located in the northwest state of Baja California. He adds that after three years of research at an experimental level at the Center and pilot tests at the National Institute of Oil, the nanotechnological catalyst counts with a national patent and is ready for tests at a refinery.

CNyN's technology uses molybdenum disulfide and is part of the fifth generation of catalytic converters, although is the first to be conceived since its origin from nanotechnology.

"We look to obtain much more efficient, resistant and cheap catalysts than what we currently can find in the market. That is why, since its design and planning are conceived under the nano concept, which improves some properties of this kind of technologies", Fuentes Moyado highlights.

He explains the process of sulfur removal. "The catalyst eliminates sulfur from the gasoline and diesel molecules, as these are deposited over small arrangements of four to five nanometers and that is where the reaction in presence of hydrogen takes place. So, at the end of the process clean molecules are obtain, that can be used for fuels".

Is important to highlight that the synthesis of the catalyst happened in the Hydrocarbon Processing Laboratory, which was created for this project in the facilities of the CNyN in Baja California.



"Currently we are testing the compound to know if it can be scaled to an industrial level to produce tons instead of kilograms and install the process at a refinery. We have presented a preview of the progress to Pemex and they are very interested in carrying out the test at a refinery. If so, the nanocatalyst would be manufactured in USA, because we don't have a company that can produce them in our country.

"A big infrastructure is required. The design we have made came from the most basic, which is understanding how the molecules bond to the catalyst and how we can force the active sites of the molecules to have more contact with the fluid, being either gasoline or diesel. There is a design involved with the application of knowledge", said the director of CNyN.

The project was funded by the Energy Secretariat (Sener) and the National Council of Science and Technology (CONACyT) with more than 66 million of Mexican pesos.

For the creation of the nanocatalyst the Physics and Material Research Institute, the Center of Applied Sciences and Technological Development at UNAM also contributed.

Another important institutions that took part of the project are the University of Veracruz, the Autonomous Metropolitan University, the Autonomous University of Baja California, the University of Papaloapan, the University of Texas and the Institute of Catalysts and Environment Research from Lyon, France.

"This is a leader project, but is a collaboration between several institutions. In the last three years we have obtained satisfying results that comply with the requirements at Pemex, given that this institution makes a great effort in generating ultraclean fuels in the refineries", Fuentes Moyado concluded. (Agencia ID)

Provided by Investigación y Desarrollo

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