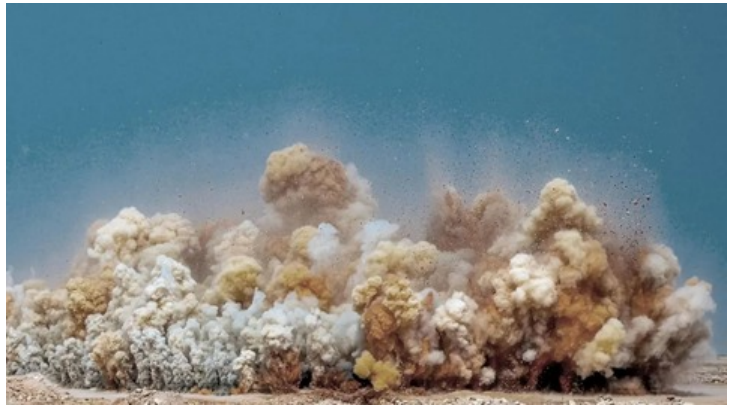


Scientists Figure Out How to Destroy Plastic Waste with Explosion

The researchers of Yenisey Siberia Research and Educational Center proposed to dispose plastic waste using a detonation wave. They suppose that this contributes to the maximum decomposition of materials without the release of toxic compounds.



Modern methods of recycling the plastic waste do not allow destroying all unnecessary plastic completely. After processing, part of the waste remains in the form of a thick mixture of crushed plastic — solid particles with a diameter of less than 5 mm with an admixture of glue, paper and other materials.

According to scientists of Yenisey Siberia REC, this is an extremely dangerous type of plastic waste, the most common in water and soil. It enters the body of animals and humans through water, air and food, poisoning entire food chains, and its number is growing every year.

One of the most dangerous sources of microplastics is waste that accumulates in remote areas. Collecting plastic in such regions is economically impractical due to logistical costs. Today, all over the world, such waste is stored in landfills of a huge area.

Siberian scientists have proposed to deal with environmental microplastics contamination by destroying with an explosion. Detonation and combustion are similar in nature, but different in terms of conditions and result. The incineration chambers maintain a temperature of 1200 °C at a pressure of about 1 atm, whereas in the detonation wave front the temperature is more than 3000 °C and the pressure exceeds 50,000 atm.

"There are seven categories of plastic: six of them can be decomposed to carbon dioxide and water using our way. The most difficult to process are plastics of the seventh type, which, in addition to oxygen, carbon and hydrogen atoms, contain inclusions of chlorine and fluorine. We can also recycle such plastic, and at the same time we will get salts that will not harm nature," said **Sergey Kostylev** head of Industrial Explosive Technologies integrated scientific and technical program.

According to him, it is not necessary to arrange explosions specifically for the disposal of plastic. Small amounts of such waste can be added to explosives during drilling and blasting operations, and if the concentration of plastic is selected correctly, the explosive characteristics of the detonation mixture will not be affected.

In this case, the scientists believe it is possible to achieve the maximum degree of decomposition of the polymer bases of plastic to simple substances, and without releasing toxic combustion products — carbon monoxide and nitrogen oxides — into the atmosphere.

"We propose the following: if a waste recycling factory cannot dispose of something, then let them grind, dry and give it to us - we will figure it out," added **Dr Kostylev**.

The activities of Yenisey Siberia research and educational center, established on the basis of Siberian Federal University on the initiative of Krasnoyarsk Territory, the Republics of Khakassia and Tyva, are aimed at improving the environmental situation in Russia and decarbonizing industry. The REC consists of 9 universities, 5 research institutes, and 14 industrial enterprises.

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