

The ultimate retread

How to turn old tyres into abrasives and other useful things.



OLD tyres are notoriously difficult to recycle, and often end up in landfills, but researchers at the Tubitak Marmara Research Centre in Gebze, Turkey, have come up with a novel way to deal with them. They are reacting them with sand and turning them into silicon carbide, a material that can fetch up to €10,000 (\$13,000) a tonne.

Silicon carbide, known commercially as carborundum, is formed of carbon and silicon atoms arranged in a diamond-like pattern, which results in diamond-like properties. On the Mohs scale of mineral hardness, which has diamond as ten, carborundum scores nine or better. It thus has a wide range of uses, from abrasives and cutting tools to bullet-proof vests and ceramic brakes in sports cars. It is also used as a semiconductor in high-voltage applications.

Normally, silicon carbide is produced by heating sand (which is made of quartz, or silicon dioxide) in an electric furnace with carbon made from oil or coal. The trick used at Tubitak is to get both the carbon and the energy from tyres.

First, the tyres are gasified, a process which is similar to burning but involves less oxygen. This releases a mixture of hydrogen and carbon monoxide, known as syngas, and leaves a residue of amorphous elemental carbon called carbon black. Tyres also contain sulphur, which is added as part of the process of vulcanisation that makes rubber into a suitably resilient material. Gasification liberates this in its elemental form, making it easy to recover. Burning a tyre, by contrast, produces sulphur dioxide, a noxious pollutant.

The carbon black is then mixed with sand and the mixture is heated to between 1,400°C and 2,100°C in a syngas-fired oven. The result is high-grade silicon carbide.

Tubitak is one of nine collaborators in what is known as the TyGRe project, a European Union-financed endeavour intended to make useful things out of redundant rubber. The project was started as a way of dealing with the 325,000 tonnes of tyres sent to landfills across Europe each year. If those can now be turned into something useful, this TyGRe will really have earned its stripes.

Fonte: The Economist, Aug. 9th 2010. Disponivel em: <www.economist.com>. Acesso em: 12 ago. 2010.