

## BUSINESS



The Stagecoach fleet now uses the Envirox fuel additive in all its vehicles.

## Nanotech growing pains

A licensing dispute over fuel additives could spell trouble for one of Britain's nanotechnology stars, as **Katharine Sanderson** reports.

A few months back, the outlook was bright for Oxonica. Last August, the nanotechnology firm signed a £6-million (US\$12-million) deal to sell its nanoparticle-based fuel additive to the Turkish oil firm Petrol Ofisi. But now, that deal is in trouble — and Oxonica is locked in a court battle over the intellectual property behind the additive, called Envirox.

On 23 February, the company asked the High Court in London to rule that it doesn't need to keep paying royalties for the product to Neuftec, a company registered in the Caribbean island of Dominica that first licensed the fuel-additive technology to Oxonica in 2001.

Oxonica says that it now uses a different technology to make its additive, and that its product therefore no longer falls under Neuftec's patent. The case is characteristic, analysts say, of the intellectual-property arguments that are likely to sear through the nanotechnology industry as more ideas make the transition from research to commercial products.

"When it comes to intellectual property, companies will need to get together," says Michael Holman of Lux Research, a New York consultancy firm that specializes in nanotechnology. "A lot of areas have very dense and overlapping patent spaces." If such legal battles are to be avoided, Holman says, companies that hold patents on ideas will have to cooperate closely and carefully with those, such as Oxonica, that specialize in their practical application.

Envirox was originally based on an idea developed by two businessmen, Ronen Hazarika and Bryan Morgan, who were looking for ways to improve fuel efficiency and were conducting their own, crude trials in their families' cars.

In 2000, they patented an additive consisting

of nanoparticles of cerium oxide, an oxidation catalyst, that had its surface treated to help it disperse in diesel. Morgan and Hazarika then set up Neuftec in Dominica, and gave it control of the patent. They also approached Oxonica with their idea. Oxonica licensed the patent from Neuftec, hired Hazarika in July 2001, and developed the product as Envirox. A third company, Australian-based Advanced Nanotechnology, supplied Oxonica with the cerium oxide particles used in the additive.

Oxonica, which was started at the University of Oxford, UK, in 1999, says that Envirox improved fuel efficiency by up to 11% in initial trials. The product soon became popular. In 2004, Stagecoach, one of Britain's largest bus operators, said that it would use it in all of its buses. Last week, the bus firm confirmed that it was still doing so.

But Hazarika left Oxonica in September 2005 for undisclosed reasons. A year later, Oxonica signed a deal with Petrol Ofisi to use Envirox in its diesel fuel. But by then, Oxonica had introduced a second additive, also based on cerium oxide, from a different supplier. Oxonica claims that this alternative additive does not fall under Neuftec's patent — but Neuftec disagrees.



Hazarika, who now works for a Singapore company called Energenics, says that Oxonica refused to divulge the composition of its new additive. "We were constrained by confidentiality from our supplier — we made that clear to Neuftec," says Kevin Matthews, chief executive of the Oxford firm. Neuftec gave Oxonica an ultimatum: reveal the details of the product by 23 February, or face legal action. "We wanted to understand why they did it — what led to the second product being developed and what the composition was," says Hazarika.

The day the deadline passed, Oxonica did not give Neuftec the details, but instead took the matter to court. "We filed to protect ourselves," says Matthews. "We asked the court to take a judgment as to whether the product was licensed or not." On 11 April, Neuftec filed a defence and counter-claim against Oxonica at the High Court.

Hazarika also claims that Oxonica is selling its new additive on the basis of test results from the first product — something that Matthews denies. "Of course we have got new test results," he says. The difference between the products concerns the surface treatment used to stabilize the cerium oxide nanoparticles in the fuel, Matthews says. He adds that Oxonica would like to sell the two in combination — although it won't use Neuftec's formulation while the dispute plays out in court.

### Trial troubles

Meanwhile, Oxonica's Turkish deal seems to be in trouble. On 28 March, Oxonica issued a statement saying that although initial field tests with Petrol Ofisi in Turkey had shown a fuel saving of 1–1.5%, a second trial was "inconclusive and it has not been possible to identify whether there has been any improvement in fuel economy". These results were a "hit in the shins" for Oxonica, says David Gittins, a chemical engineer who assesses new technologies for Imerys Performance Minerals near St Austell, UK. The company's shares dropped after the announcement (see chart).

In an extra twist, Advanced Nanotechnology is now working with Hazarika's new company, Energenics, to try to sell the fuel additive in North America. Even if it loses its battle with Oxonica, Neuftec will still have its patents — although Hazarika is unsure whether the same additive will be used again. "The product is tainted by what is going on in Turkey," he says.

The case isn't the first of its kind and certainly won't be the last, as nanotechnology products and processes flood the market. "Oxonica need to be able to get these intellectual-property issues sorted out to get the value they need from the technology," says Holman. "It's a lesson that companies need to pay attention to."