Wrapping up the problem of broken light bulbs

FEARS that compact fluorescent lamps (CFLs) might pose a health risk may now be eased, thanks to a cloth impregnated with nanoparticles that soak up mercury. Used in protective packaging, the cloth would absorb mercury vapour released if the bulbs break in transit.

Energy-efficient CFLs work by passing a current through mercury vapour. This excites mercury atoms, making them emit ultraviolet light, which in turn causes a phosphorescent coating on the inside of the bulb to emit visible light. CFLs use up to 75 per cent less energy than incandescent bulbs and can last 10 times as long.

Each bulb contains up to 5 milligrams of mercury, and this has led to fears that the health of children and pregnant women could be at risk when the bulbs break. "There is a mercury vapour exposure concern in the first 15 minutes after the bulb has broken," says Michael Bender, director of the non-profit Mercury Policy Project in Montpelier, Vermont.

Selenium bonds strongly with mercury to form mercury selenide, and Robert Hurt and his team at Brown University, Rhode Island, have found that it does this particularly effectively when in nanoparticle form. "It creates a high surface area that wants to hold onto mercury," explains Steve Dunn from Cranfield University, Bedfordshire, in the UK.

Less than 1 gram of selenium nanoparticles can absorb 99 per cent of the mercury vapour released from a broken CFL, making it cheaper and more efficient than other materials capable of soaking up mercury.

> "There is a mercury vapour exposure concern in the first 15 minutes after the bulb has broken"

The Brown University team has also produced a plastic bag impregnated with selenium particles in which old bulbs can be placed before they are thrown away. The team presented its results at the American Chemical Society meeting in Philadelphia this week.

"It looks likes a step in the right direction to allay consumer concerns," Bender says. The US plans to phase out incandescent bulbs by 2012 and replace them with CFLs. Gursharan Randhawa