RECOVERING VALUABLE MATERIALS

Recycling LCD panels

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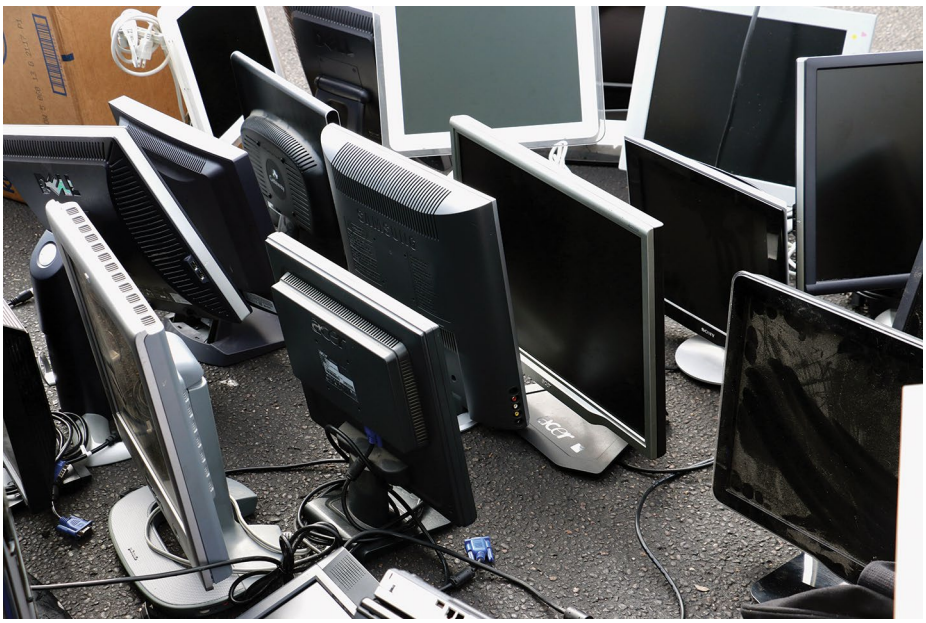

Credit: Tom Uhlman / Alamy Stock Photo

Short-lived electronic devices have become a significant waste stream. This waste is a potential source of valuable metals, but only a small portion is currently recycled. A common electronic waste is the liquid-crystal display (LCD) screen used in computers and televisions. LCDs contain two glass plates sandwiching a liquid-crystal mixture. The outer plate surfaces are covered with polarizer films, but the inner plate surfaces contain a functional indium tin oxide film. Indium is a critical raw material with limited supplies and high costs. Several possible recycling methods have been developed to recover indium but purity remains low.

Ville Lahtela and colleagues from LUT University in Finland compared several pre-treatment methods to produce high-purity indium. First, LCD panels were split, and liquid crystals were removed. Then, combinations of mechanical abrasion, plasma, heat, and laser pre-treatment methods were tested. Using brushing with sand abrasion, the authors recovered 96.2% of the indium, and this pre-treatment made indium recovery economically feasible by significantly reducing the mass needing further treatment. Next, sulfuric acid leaching was used to increase the purity up to 97.1%. This is another step towards recycling more electronics waste and recovering indium.

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