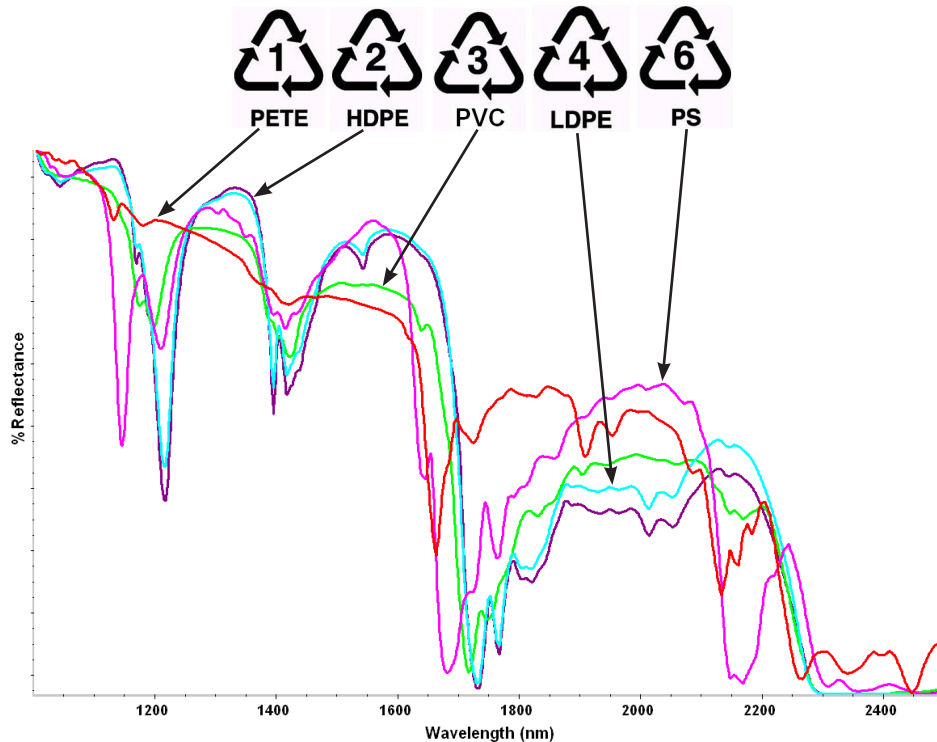


# RECYCLING AND WASTE MANAGEMENT

Recycling plants can reduce costs and improve production quality by replacing manual sorting with efficient machine-based methods. Sorting machines and methods include weighing, magnets and spectroscopic identification. A hyperspectral imaging (HSI) camera can be placed directly over a sorting line to measure all the recycled items as they move through. The HSI push-broom camera measures a line of spatial points at one time. The spectral information from each point can be transferred to a computer and processed in real-time for material identification. The spectra of several types of plastic (PETE, HDPE, PVC, LDPE, and PS) are shown here. Both the SWIR (1000 - 2500 nm) and NIR (1000 - 1700 nm) wavelength ranges are useful for identifying recyclable plastics.



## Recycling Application

Researchers at Degli Studi University of Rome, Italy examined the problem of ceramic glass, which, when mixed with recyclable glass, reduces production quality and increases costs. Because ceramic glass is very similar in appearance to recyclable glass, inadvertent mixing is quite common. The study demonstrated that with hyperspectral imaging technology, distinctions can be made between recyclable glass and ceramic glass in both visible and near infrared wavelength ranges. (Bonifazi, 2006)

## Waste Management Application

Hazardous waste site inspection is expensive, labor intensive, time-consuming, and is often conducted manually. Researchers at the University of South Carolina and Texas A&M University demonstrated that hyperspectral imaging technology shows excellent promise for detecting surface anomalies at hazardous waste sites as an indication of hazardous material leakage. Rapid identification of hazardous waste leakage enables remedial work to occur, potentially minimizing damage and maintaining the integrity of the storage sites. (Jensen, 2003)

## References

- Bonifazi, G., & Serranti, S. (2006). Imaging spectroscopy based strategies for ceramic glass contaminants removal in glass recycling. *Waste Management*, 26(2006), 627-639.
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