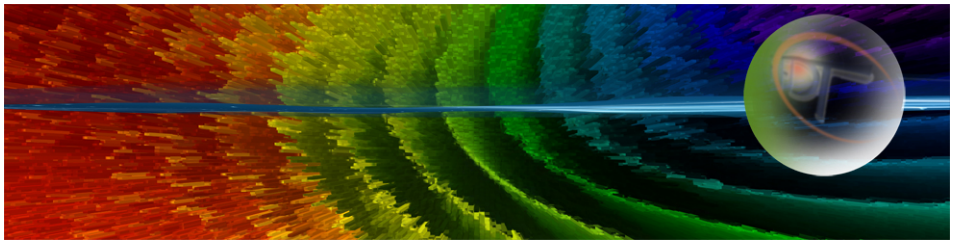

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Waste processing: new near infrared technologies for material identification and selection

The awareness of environmental issues on a global scale increases the opportunities for waste handling companies. Recovery is set to become all the more important in areas such as waste selection, minerals processing, electronic scrap, metal and plastic recycling, refuse and the food industry. Effective recycling relies on effective sorting. Sorting is a single element of the waste disposal/recovery process, but it is a vital part. The big players in the sorting market are pushing for the creation of new technologies to cope with literally any type of waste. This has led to the presence of a wide range of sorting application on the market today. The new emerging technologies rely on the use of sensors to achieve high level of efficiency. New technologies based on hyperspectral imaging are entering the market because of the new possibilities they offer for the classification of materials. They can satisfy the increased level of quality of recycled products complying with specific standards determined by industrial applications. Near Infrared (NIR) spectra of materials contain information regarding their chemical composition and molecular structure. These features can be used to distinguish different types of material within an undifferentiated sample for industrial purposes. NIR spectroscopy offers a unique combination of speed, simplicity of sample preparation, easy usage, non-destructiveness and good reproducibility.
After an overview of spectroscopic and analytical techniques used for the recognition of different materials, I will speak of a new method based on the NIR spectral images developed for the identification of different classes of materials present in wood waste. We have investigated the spectrum of a wide sample of materials as plastics, ceramics, tiles, woods, laminates in the range 1100 - 2500 nm. We found those features that characterized the different classes of materials and searched for those spectral regions able to distinguish them. We identified the spectral bands potentially most effective in the discrimination process and we defined different indices able to distinguish among different materials. The developed classification method shows that the near infrared spectral analysis can be used as an efficient technique to identify different objects, facilitating rapid and accurate separation process. We present the approach and the first results of the new identification and selection process.

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