

**KEYWORDS:** Cold plasma, reduction, oxidation, micro-nanometric powders; Recycling

## BACKGROUND

The recycling of devices may be difficult especially when these comprise different materials. Most recycling processes consist in a succession of hydrometallurgical and or pyrometallurgical operations, with significant environmental and security issues. Indeed these operations are highly energy-consuming, often generate pollutants and/or lead to soil and water contamination , e.g. by heavy metals.

## DESCRIPTION

The invention concerns a reactor and process for treating a composition with a non-equilibrium plasma, with full control the temperature of the said plasma. By controlling the temperature of the plasma, it is possible to selectively extract elements of interest within the composition, in the gaseous state, and to capture them within a carbon felt crossed by the plasma flow.

## COMPETITIVE ADVANTAGES

- Environment compatible process,
- Reduced thermal and chemical constraints
- Treatment operated at low pressure
- Enhanced recovery of extracted materials



## PRINCIPAL MARKET

- Recycling of waste
- Electronic components and devices
- Chemical products



## FIELDS OF APPLICATION

- Recycling, refining and transformation of strategic elements
- Production of metal powders or oxides



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## INTELLECTUAL PROPERTY

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