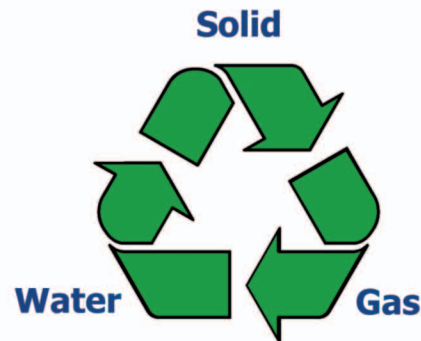




Residual engineering

Problem:

Reducing production costs and the environmental footprint of steelmaking



Solutions:

New and improved eco-efficient products by:

- utilisation of wastes, residues or recycled materials as a feedstock (to replace primary raw materials)
- waste recovery (solid, liquid, gaseous) as secondary raw materials in other industries

High density briquettes from scale in EAF



Benefits:

- operating cost reduction;
- selling of valuable waste materials
- reduction of dumping costs
- reduction of emissions of CO₂ and other GHG;
- increase of energy efficiency.

Slag for road





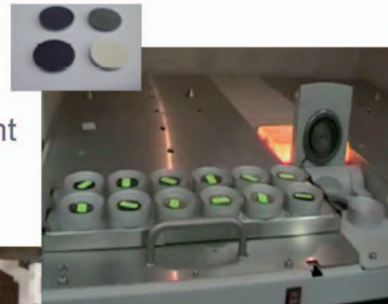
Residual engineering

Residuals engineering at CSM follows three phases:

- I. **Feasibility study:** waste characterization and process definition
- II. **Technology development:** pilot plants engineering and experimental campaigns
- III. **Industrial scaling-up:** industrial prototype plant engineering
(with engineering companies or steelmaking plant)

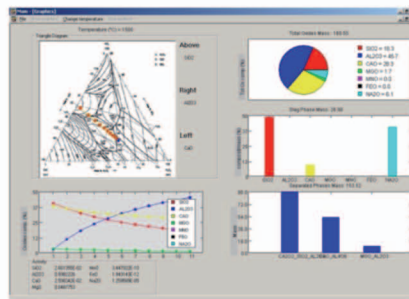
Facilities

- X-Ray Fluorescence analyzer (XRF)
- Combustion C,S analyzer (CS)
- Ionic Chromatograph (IC)
- Inductively Coupled Plasma mass spectrometry (ICP-MS)
- Inductively Coupled Plasma atomic emission spectroscopy (ICP-OES)
- Viscosity measurement
- Thermal analysis equipment
- Pyrolysis reactor
- Mass spectrometer
- Laser flash for thermal diffusivity measurement
- Furnaces for special tests
- Vacuum Induction Melting and Casting Plant



Models and tools

Thermodynamic equilibrium models
In house mass and energy balance models
Thermo-fluid dynamic tools



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