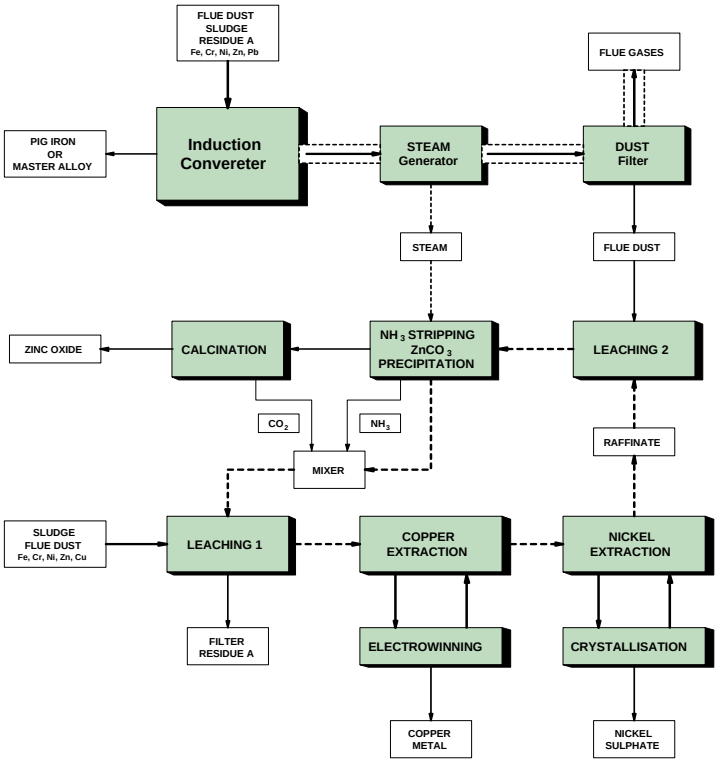
MEAB

Hydrometallurgical Process Applications

The UDDAMAR Process

Pyro/Hydro Metallurgical Concept for Treating Waste



The feasibility of a pyro/hydro-metallurgical UDDAMAR process as a centrally located recovery plant for the treatment of oxidic and hydroxidic metal containing waste from steel and metal works, including the plating industry, has been investigated some years ago in Sweden. The process, shown in the figure, is based on the use of the UDDACON induction converter and the AmMAR wet process technology

In the pyro-metallurgical treatment in the UDDACON converter-shaped, tiltable furnace, ferruginous powders are converted to pig iron or master alloys. Dried and pulverized waste (flue dust and sludge) together with fluxes and carbon powder for the reduction, suspended in a small quantity of gas, is blown into the iron melt through an injection tuyere, situated below the metal surface in the converter. Due to the fine dispersion of the feed material and the intensive turbulence in the bath, a rapid reaction occurs between the injected metal oxides and the reducing carbon in the melt. The thermal energy in the flue gases from the furnace is used in the hydrometallurgical operation and for the drying of input material.

MEAB Know-how Info 06-2010

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The first step in the AmMAR process is leaching the feed material with an ammoniacal solution. Metals like copper, nickel and zinc are forming metal ammonium complexes and will therefore dissolve in the leach solution. Other metals like iron and chromium are forming not soluble hydroxides and will be found in the residue. This residue is dried and treated in the UDDACON converter. Copper and nickel are separated from the filtered leach solution by solvent extraction, either by differential extraction of the metals, one by one, or by co-extraction followed by selective stripping. Zinc co-extraction can be neglected. Products are copper cathodes and nickel sulphate.

The secondary flue dust from the UDDACON converter, containing mainly zinc and lead, is leached with the ammoniacal raffinate solution from the Cu/Ni-extraction. Lead is left in the residue. Finally, zinc carbonate is precipitated by addition of CO_2 followed by thermal stripping of ammonia. Zinc carbonate is calcined to zinc oxide and ammonia is recycled to leaching.

Reference.

UDDACON - Pyrometallurgical Concept for Refining of Metals
Royal Tech Univ 1976, TRITA-MEL 014-017

AmMAR - Hydrometallurgical Concept for Metal Waste Recovery
Proc Intl Solv Extr Conf, York, UK, 1993