

Sintering

Input: Pb Concentrate + iron, silica, limestone fluxes, coke etc.

Reaction: $2\text{PbS} + 3\text{O}_2 \Rightarrow 2\text{PbO} + 2\text{SO}_2$

Input: Lead scrap, battery waste + slag, scrap iron, limestone, coke, oxides, dross, and reverberatory slag

Slimes & sludges, battery scrap antimony & lead-rich

Indirect processing

Slimes and sludges battery scrap antimony and lead rich are made by aqueous alkaline leaching of the majority of the sulphate from the lead-containing material recovered from recycled lead-acid batteries. The lead is mainly present as carbonates.

$$\text{PbSO}_4 \text{ (paste)} + 2 \text{ NaOH (aq)} \rightarrow \text{PbO (paste)} + \text{Na}_2\text{SO}_4\text{(aq)} + \text{H}_2\text{O}$$
$$\text{PbSO}_4 \text{ (paste)} + \text{Na}_2\text{CO}_3 \text{ (aq)} \rightarrow \text{PbCO}_3 \text{ (paste)} + \text{Na}_2\text{SO}_4\text{(aq)}$$

Direct processing:

Wastes, lead battery reprocessing is made by recovering the lead compounds from exhausted lead-acid batteries and converting it into a prepared solid feed suitable for lead smelting. Lead is mainly present as oxides, sulphates and in metallic form

1. $\text{PbSO}_4 + \text{Na}_2\text{CO}_3 \rightarrow \text{PbO} + \text{Na}_2\text{SO}_4 + \text{CO}_2$
2. $\text{PbO}_2 + \text{Fe} \rightarrow \text{PbO} + \text{FeO}$
3. $2\text{PbO}_2 + 2\text{Fe} + \text{C} \rightarrow 2\text{Pb} + 2\text{FeO} + \text{CO}_2$

