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CLEANING OF TECHNOLOGICAL GASES OF SINTERING PRODUCTION

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Joint influence of ions of iron (II)/(III) and ions of manganese (II) is investigational in solution on the process of liquid-phase oxidation of sulphur (IV) oxide. It is set that Fe-Mn solutions possess a higher sorptive capacity as compared to solutions of iron (III) ions and less sensitiveness to the temperature as compared to solutions, containing the manganese (II) ions. The increase of quantity of eaten up the sulphur (IV) oxide results solution in formation of more concentrated solutions of sulphuric acid, which facilitates their further utilization.

Keywords: sintering production, technological gases, sulphur (IV) oxide, sorptive capacity, ions of iron (III), ions of manganese (II)

Entry. For end gases on metallurgical productions are characterized high charges, subzero concentration of toxic gaseous components (oxides of sulphur and nitrogen), and also presence of dust.

By theoretical researches it is educed, that most effective are methods of absorption with simultaneous liquid-phase oxidization of sulphur (IV) oxide by oxygen of air in presence connections of transitional metals.

Raising of task. The purpose of work is research of consistent influence of iron (II) and (III) ions and manganese (II) ions in solution on the process of liquid-phase oxidization of sulphur (IV) oxide.

Research methods. As initial reagents used electrochemical treated solutions of sodium chloride, that contain iron (II) and (III) connections, solutions of manganese (II) salts, air-gas mixture with the sulphur (IV) oxide. Electrochemical treated solutions of sodium chloride are got in a tebladderless electrolyzer with ferrous electrodes at next conditions: voltage on electrodes (12-24) V, strength of current (0.5-2.5) A, initial concentration of sodium chloride 0.01-0.10 g/l, sodium chloride of mark of «kh.ch». Total initial concentration of iron (II) and (III) ions in solutions folds 18.0 g/m^3, and a concentration of manganese (II) ions in absorptive solution is 6-18 g/m^3.

The sulphur (IV) oxide was got decomposition of sodium sulfite by the concentrated sulphuric acid. Its an initial concentration folds 1.89-1.88 g/m^3. Absorptions of sulphur (IV) oxide executed in an aspirator with a porous partition at bubbling of air-gas mixture the expense of which folds 1.0 l/min, and temperature of air-gas mixture – 22-80 ºC.

The concentration of iron ions in solution was determined by a photocolorimetric method with sulfisolicylic acid [1], and the concentration of

sulphur (IV) oxide in gas mixture and solutions was determined by a turbodymetric method with a glycol reagent. For an analysis used the elecrtophotocolorimeter of EFC-03.

The results of research and their discussion For determination of consistent influence of iron and manganese ions on the process of absorption got dependences of concentration of sulphurs (IV) oxide which absorbed, in an absorber from duration of absorption for the different initial concentrations of ions threw in solution on the different level of temperature. Increase of temperature for air-gas mixture in the investigated range are accompanied by the increase of quantity of eaten up the sulphur (IV) oxide for all solutions. The increase of absorptive capacity of solution with the increase of temperature specifies on flowing of chemical reactions in a reactionary volume [2,3]. For the temperatures of mixture more than 65 °C takes place more substantial increase of absorptive capacity of solution which contains the iron (II)/(III) ions, [$C_{Fe\text{tot}}$ = 18 mg/l]. For solutions which contain the *Mn*(II) ions [$C_{Mn(\text{II})}$ = 18 mg/l] at the temperatures of mixture more than 52 ºC is not observed considerably increase of absorptive capacity of solution.

In turn, during addition of *Fe*(III) ions ($C_{Fe\text{tot}}$ = 12.0 g/m^3 and *Mn* ions [$C_{Mn(\text{II})}$ = 6.0 g/m^3] to solution there are fixed the substantial increase of absorptive capacity of solution and for temperatures higher, than 52 ºC. This circumstance testifies to exceeding of speed for catalytic oxidization of sulphur (IV) oxide of speed decline size of physical dissolution of sulphur (IV) oxide and oxygen a size in an absorber.

The curves for dependences of reaction speed on duration of absorption specify on smoother decline of speed of oxidization of sulphur (IV)oxide at the general being in solution of iron (III) and manganese (II) ions comparatively with solutions of iron salts.

Such even decline of speed of oxidization for sulphur (IV) oxide and stipulated the increase of absorptive capacity of *Fe-Mn* solution comparatively with solutions which contain only the iron (III) or manganese ions.

More credible that, such character of oxidization process flowing of sulphur (IV) oxide by *Fe-Mn* solutions will allow to increase multipleness of the use of absorber. At the same time an increase over of quantity of eaten up the sulphur (IV) oxide by solution to formation of more concentrated solutions of sulphuric acid which facilitates them further utilization.

Conclusion. Consistent influence of iron (III) ions and of manganese (II) ions is investigational in solution on the process of liquid-phase oxidization of sulphur (IV) oxide [4]. It is set that *Fe-Mn* solutions have a higher sorptive capacity comparatively with solutions of iron (III) ions and less sensitiveness to the temperature comparatively with solutions which contain the manganese (II) ions. The use of such solutions is perspective and necessary implementation of further researches in relation to determination of basic thermodynamics and kinetic descriptions of process.

References

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