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ALKALINE HYDROMETALLURGICAL APPROACH FOR STEEL SLAG MANAGEMENT



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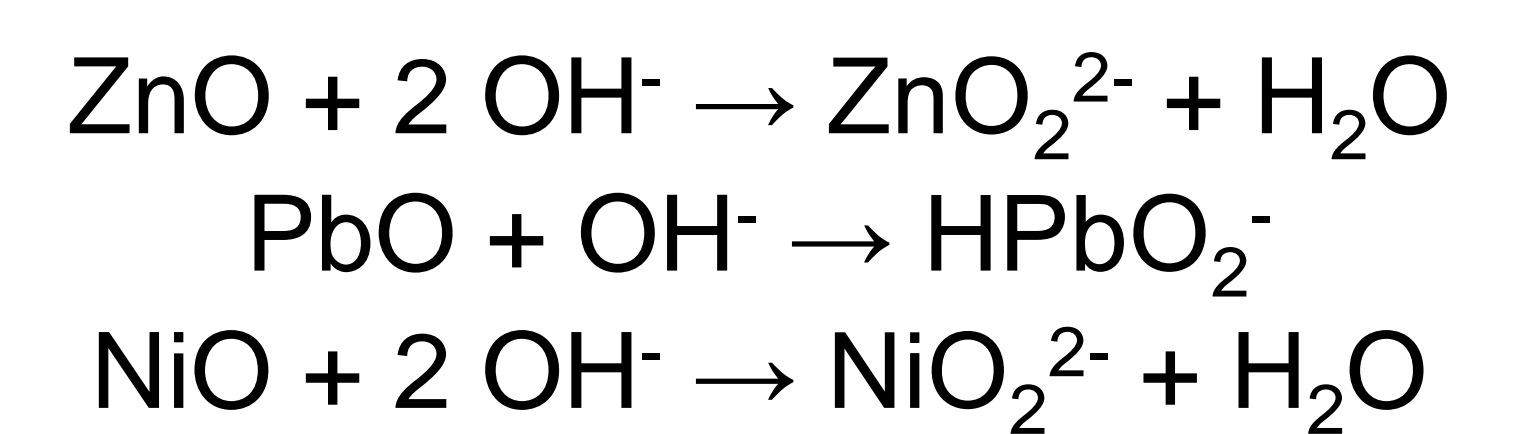
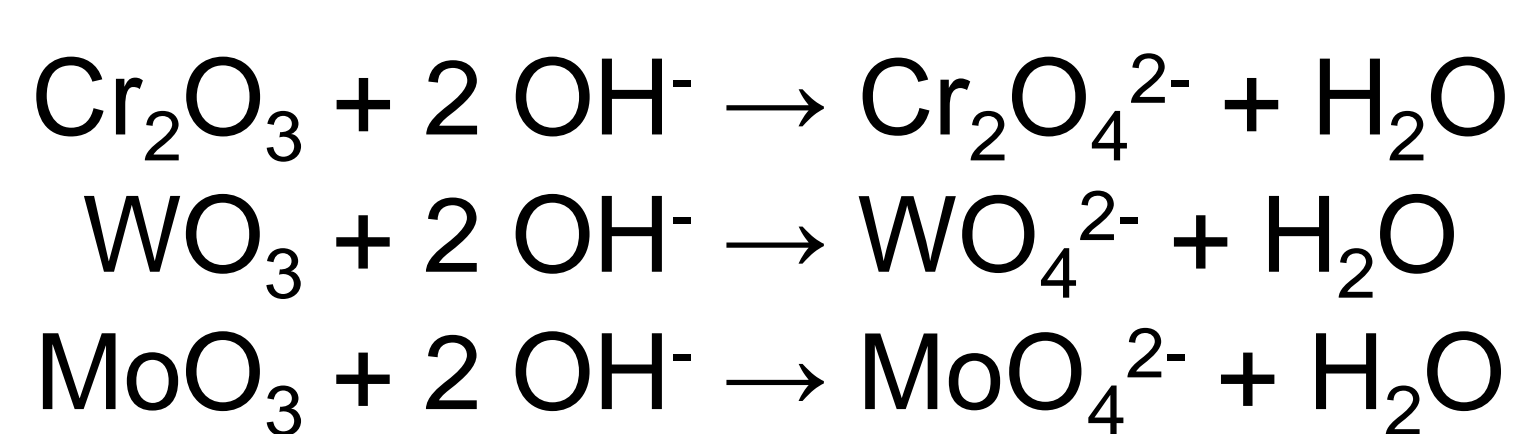
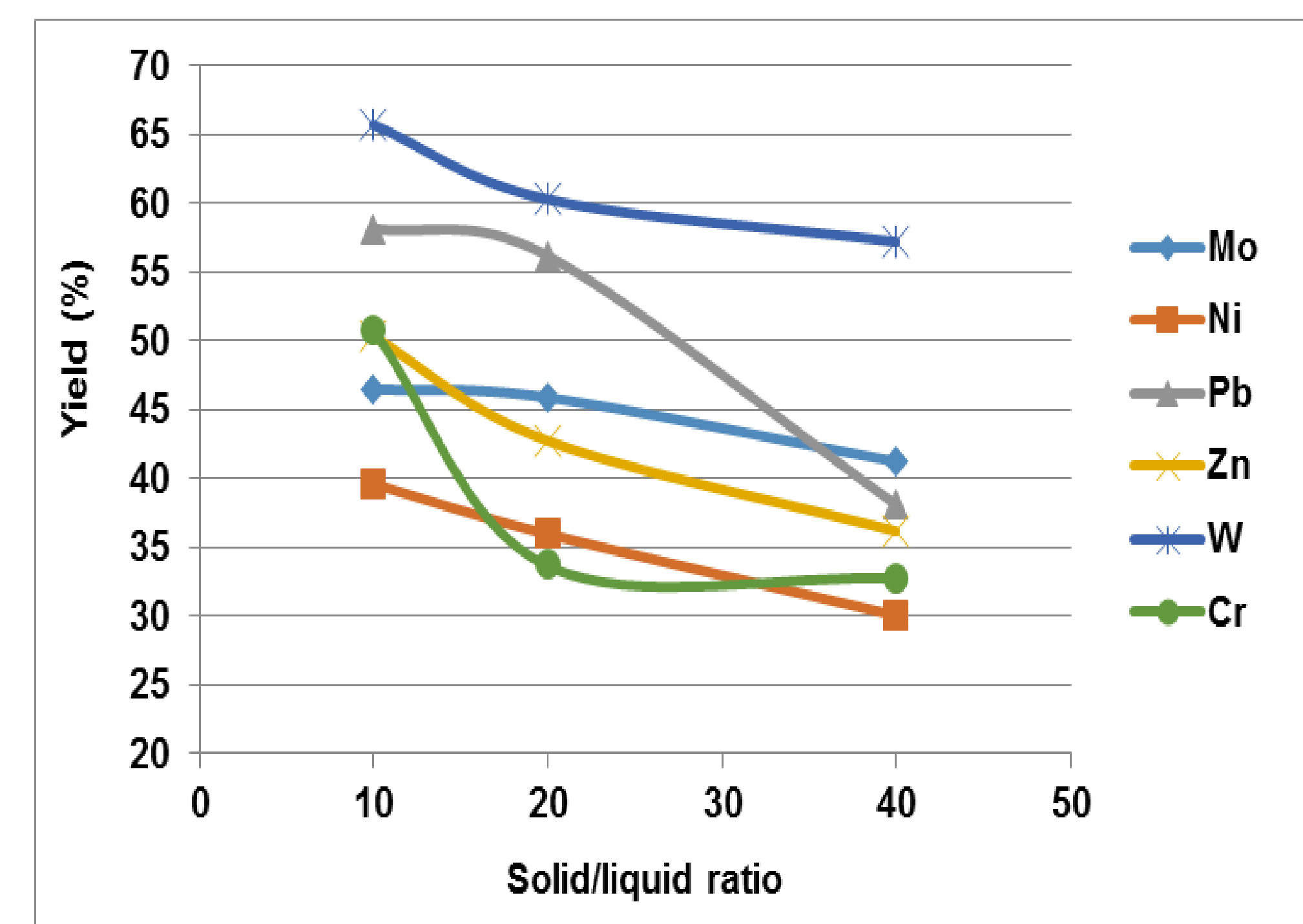
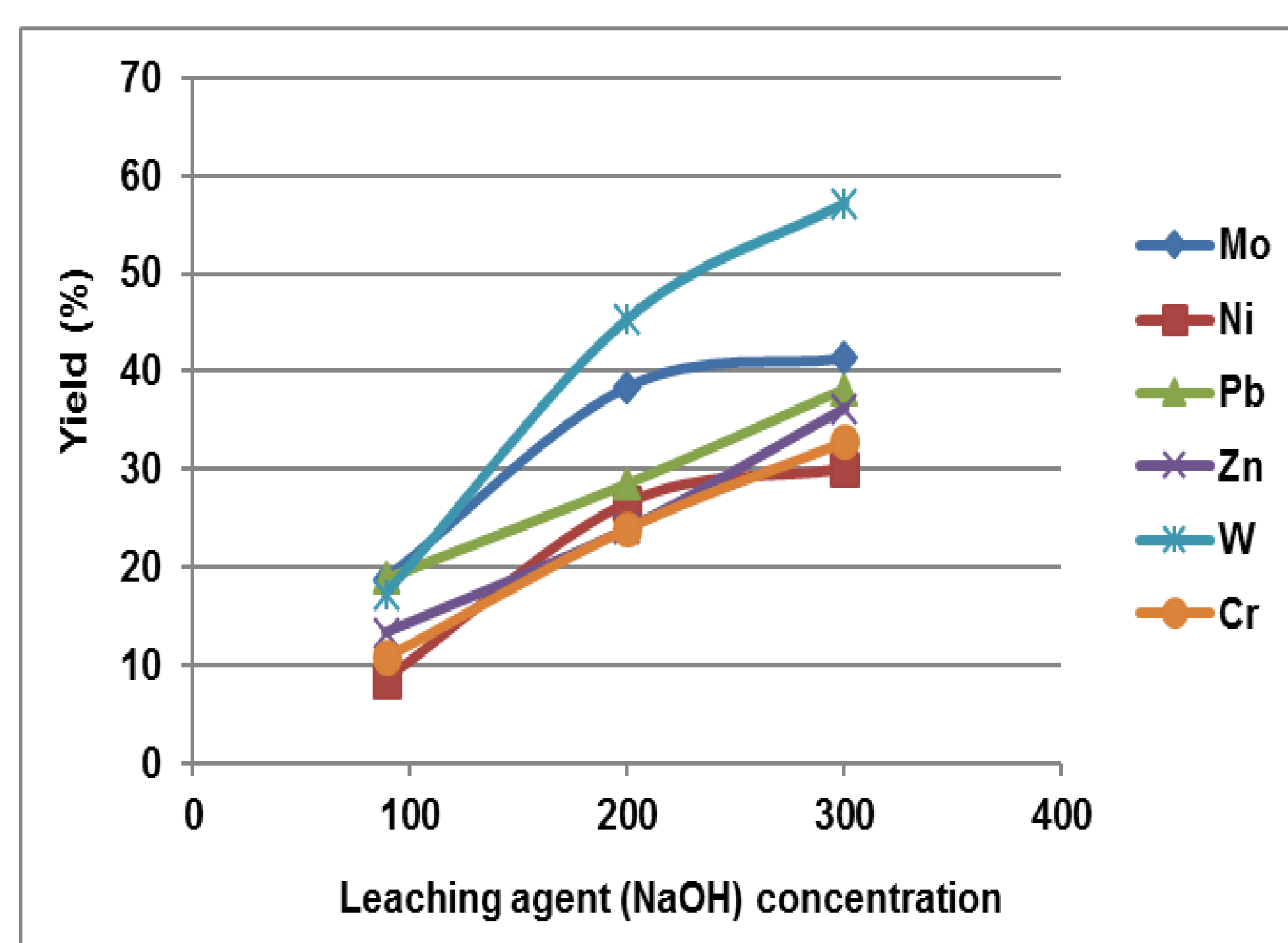
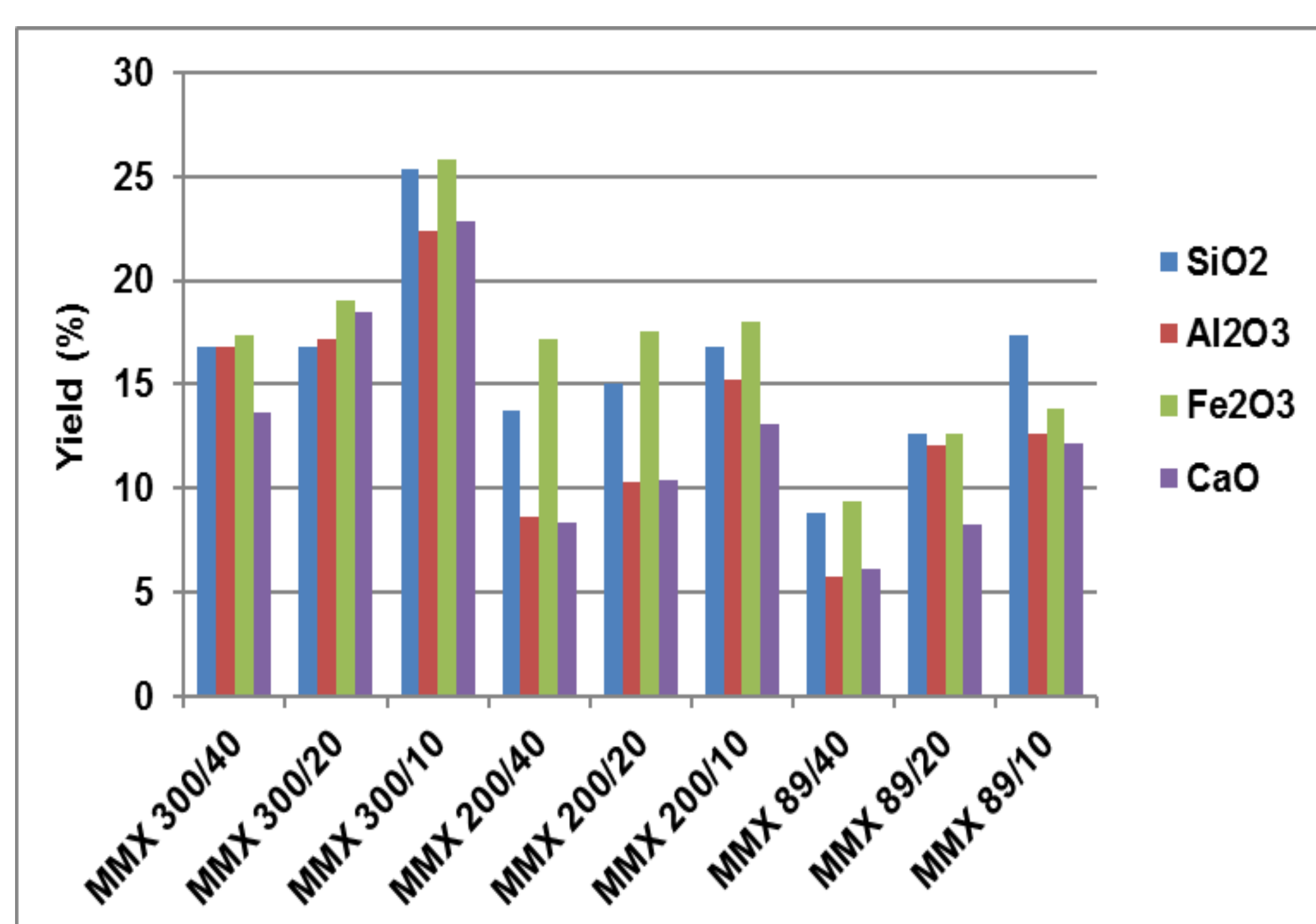
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Context

Steel slags are artificial mineral matrices produced by the steel and iron industry. While they are considered as industrial waste, these slag heaps represent an important potential economic resource. The importance of hydrometallurgy in production and recycling of strategic metals cannot be stressed enough. Nevertheless, their use is increasingly under economic pressure since 2014. Clearly, improving or even optimizing these processes is required. In addition, although steel slags are classified as non-hazardous thermal waste, it is well known that most metals they contain are quite toxic to living organisms and pose serious environmental issues. Thus, reusing steel slags appears the option of choice to ensure their sustainable management.

Experimental

Incorporated into mineral matrices and sometimes committed in the form of ferrites type, strategic metal-based (Cr, W, etc.) non-ferrous oxides have rarely been the subject of specific treatments. When keeping the mineral matrix intact is desired for its subsequent reuse, processing technologies with acid leaching agents are inapplicable and to be avoided. The alkaline earth metals rich composition of steel slags are attractive materials for potential users.



Conclusions

The innovation was implementing selective unitary operations set on the chemical nature of (EAF-S) non-ferrous metals. The scientific approach consisted in adapting the alkaline middle (use of soda ash as leaching agent) of selective lixiviation and the separation methods in order to optimize the strategic metals extraction rates while choosing conditions and environments that do not present side effects and allow a minimization of the environmental impacts. Soda ash's weak corrosion power and selectivity showed many benefits. Iron and calcium, present in (EAF-S), were poorly leached at the end of alkaline treatment (mineral matrix preservation). Moreover, adding lime in a soda ash solution precipitated the silicates and carbonates thus returned the leaching solution to its initial state.