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Explore the Facts of Chemistry in Daily Life

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Editorial

On behalf of the Board of the International Journal of Chemical Sciences (ISSN 0972-768 X) and my co-editors, I am glad to present the Volume 18, Issue 2 of the journal. The journal established in 2003 has now published 18 volumes; appx. Of four issues in a year. The journal is indexed in Directory of Open Access Journals and also by different academic forums. Average download per article is increasing and on an average downloads per paper. All these are promising signs. We could reach this stage through the constant support of Board Members and intellectual generosity of the readers and contributors (authors and reviewers).

Here are some of the Interesting articles which explore the real time experiences in chemistry. Let them be known in detail.

Characterization of Cobalt Oxides Transformations with Temperature at Different Atmospheres:

Cobalt is a transition metal with many oxidation states, which results in the formation of different oxides, such as CoO, CoO_2, Co_2O_3, Co_3O_4, etc. Their exceptional properties generate a great interest in optic, catalysis and ceramic industries, so the deep study of the cobalt oxide transformations with temperature in different atmospheres is the key to improve the industrial processes. The aim of the work was to devise the transformations of the cobalt oxides by undergoing different heating cycles in three atmospheres (air, nitrogen/hydrogen and oxygen) and to carry out a complete characterization of each compound obtained from the treatments. Different materials based on cobalt compounds, such as $Co(OH)_2$, Co°, CoO and Co_3O_4, have been treated in different atmospheres (air, nitrogen/hydrogen and oxygen), and temperature conditions. The formation of Co_3O_4as a product of the treatment of $Co(OH)_2$ under an oxidative atmosphere, the obtaining of CoO and Co° from the thermal

treatment of Co_3O_4in a reductive atmosphere and the production of $Co_3O_4$from the oxidation of Co° and CoO were studied. All the materials were characterized by determining the cobalt content by WD-XRF, the oxygen concentration by an elemental analyzer and the crystalline phases by XRD and FT-IR Ke.

Conclusions

The experiments realized in the three atmospheres and at different temperatures have allowed performing a quantitative study about the cobalt oxide transformations at each condition. Cobalt (II, III) oxide (Co_3O_4) was obtained after treating the cobalt hydroxide ($Co(OH)_2$) at 350°Cin an air atmosphere. Furthermore, Co_3O_4 treated at 900°Cin air atmosphere for 30 min gave major phase CoO and minor Co_3O_4.

Adsorption of Ni_{2+} and $Cd_{2+}$from Aqueous Solution by Using Natural Zeolites

Heavy metals from wastewater are major pollutants of the environment. To remove these pollutants adsorption by natural zeolite has been used. The physic-chemical properties of the adsorbent were characterized by AAS and FTIR spectrophotometers. Then the adsorption efficiency of the adsorbent was optimized as a function of pH, dose of the adsorbent, initial concentration of adsorb ate and contact time. The findings of this study showed the optimal metal adsorption was 98.94% for Cd and 91.2% for Ni at pH 6, 0.002 g/mL dose of the adsorbent, 120 min contact time and 0.001 g/mL initial concentration of the adsorb ate. Indeed, the adsorption and isotherm studies were discovered that kinetics and adsorptions were well described by the pseudo-second order and the Freundlich isotherm model fitted to the equilibrium data better than the Langmuir model did. So, this study confirmed that adsorption of heavy metals from aqueous solution by natural zeolites was very promising and efficient.

Conclusion

This study revealed that natural zeolite can be effectively employed as a good adsorbent for the removal of Ni2+and Cd2+ions from aqueous solution. The removal of Ni_2 and Cd_2 ions from aqueous solution were dependent on pH, adsorbent dose, contact time and initial concentration of adsorb ate. The data obtained in this study was described by Langmuir and Freundlich isotherm. Freundlich adsorption isotherm fitted best implying that there was multilayer coverage of the metal ions the surface of the adsorbent. The adsorption data also fitted well for Pseudo-second order model. Therefore, natural zeolites as adsorbents of heavy metal were very sensitive to remediate the environment by naturally available and environmental friendly inorganic materials.

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