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Journal Name:	American Chemical Science Journal
Manuscript Number:	2014_ACSj_10877
Title of the Manuscript:	Synthesis, Charecterization and Chelation Ion-Exchange Studies of a Resin Copolymer Derived from 8-Hydroxyquinoline-Formaldehyde-pyrogallol
Type of the Article	<u>Review Article</u>

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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(<http://www.sciencedomain.org/page.php?id=sdi-general-editorial-policy#Peer-Review-Guideline>)



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PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<u>Compulsory</u> REVISION comments	COMMENTS AND SUGGESTIONS This work could be interesting but appears to me not well constructed and I think that the authors could improve several aspects. These are my comments and suggestions: 1. Please Re-write, organize and focus the purpose of resin synthesis and its application for waste water treatment or industrial waste treatment. If the introduction using waste water treatment approach or industrial waste recycling approach mentioned, the importance of the work will be magnified. The current introduction is only about reference of previous reported papers not application prospective. The originality of manuscript and important application of the piece of work has not been explained, focused and organized manner. Please try to focus on it. 2. Author should be confirmed regarding the purity of resin. 3. What is the particle size of resin, as it affect ion exchange process.	1.I rewrite and I tried to focus on the application of the resin in the treatment of wastewater. For this I added the part where we tested the role of the resin for Removal of toxic metal from industrial effluents: Analytical application (line 300).I tried to explain focus to show The originality of our work. 3. The role of physical core structure of resin is significant in the uptake of different metal ions by the resin copolymers. From the results, it is observed that the rate of exchange of metal ions is faster in beginning and then slow down. These happen due to elimination or exchange of ions from the solution to the surface of the resin and after the entire available site (group) of resin were



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	4. The amorphous/crystalline nature of the polymer only can be discussed from XRD. Hence XRD is needed. 5. In the ion-exchange studies, the value of ion exchange capacity should be reported for particular metal ions. 6 How will you calculate the amount of metal ion uptake in m.mol/g? 7. What is the uptake value of the other metal ions? Any comparative account is there? 8. The conclusion part should be brief and it is much elaborated which need to be altered. 9. According to the study, the empirical formula should be calculated 10. IR spectrum is not interpreted correctly. 11. Add purity and industrial preparation technique and cost effective prospective in experimental section. What is the cost of material synthesis? 12. Have author investigated the metal adsorption behavior of synthesized metal in absence of electrolyte. If those data can be interpreted, it would explain the rationality of effect of electrolyte. Please rationalize, why author investigated different electrolyte with different concentration. What is the motivation	occupied. It gives rise to slower rate of exchange. Fig. 4 shows the rate of exchange of metal ion on the synthesized resin. (Line203) 5. I thought that the values are shown in Fig. 4 6. The formula of the amount of Exchange capacity (m.mol.g^{-1}) has been explained in the text (line 128) 7. I focused my work on only divalent metal ions like Cu (II), Zn (II) and Pb (II). Other metals are studied and I mentioned in this in the biblio. 8.I rewrite the conclusion in the text (line 321) 9. With the results of the elemental analysis the empirical formula was calculated : $\text{C}_{17}\text{H}_{13}\text{NO}_4$ (line 209) 11. The polymerization process was confirmed not only with FTIR but also with results from elemental analysis 12. In the absence of the electrolyte we did not get better results, but we noticed that tartaric acid electrolyte is best eluant than e NaNO_3, NaClO_4, NaCl, Na_2SO_4 (this comparison will be the subject of our new article) ... and I explained this choice of
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	behind the investigation? 13. The results of ion exchange study have just been stated but not analyzed. The reasons behind the variation of the uptake capacities of the different resins for different metal ions at different pH and ionic strength values have not been explained. The results have just been tabulated. This is uncharacteristic of a research paper. It can be explained in term specific value like stability constant. Have you checked how the ionic strength of electrolyte and dielectric constant affect the metal distribution or accumulation behavior of resin? Please mention how the complex formation of metal ions occurs, and then only the explanation would me more valid and understandable. 14. You have studied the adsorption behavior of metal by your resin, in text and table; you have studies near about pH 3 to 6. There is possibility of metal precipitation, please could you comment on it? 15. Can the in took metal be eluted? If yes how much %. Answer to this query would address the issue related to reuse of synthesized resin, in industrial prospective. 16. In results and discussion there are lots of scope to improve qualitative scientific	tartaric acid in the text (line 280). Batch equilibrium method is more fruitful to determine distribution coefficient (K_d) for the metal ions as a function of tartaric acid concentration. Tartaric acid is strong eluting chelating agent. It contains six oxygen atoms with unshared pair of electron, which from more stable chelating complexes with metal ion than resin-metal complexes. So tartaric acid can easy elute metal ions from resin and give clear separation. We did not take into account the activity coefficient for a strong electrolyte, we considered that the ionic strength I had no effect on the infinitely dilute solutions ($\gamma \rightarrow 1$) 13. The maximum sorption of Cu(II) took place at pH 6, Zn(II) at pH 4 and Pb(II) at pH 4. The selectivity order for metal ions is $\text{Cu(II)} > \text{Zn(II)} > \text{Pb(II)}$. In the case of Pb(II) purely electrostatic factors are responsible. Due to the less deep pits, resin exhibits lower ion exchange capacity for Pb(II). Pb(II) has bigger hydrated radii, so it cannot easily penetrate to originate in more crystalline region of the polymeric network. Therefore more clean separation could be obtained from binary mixture of either Pb(II) with
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	explanation, please focus on it. 17 The language is very poor. 18. Have you not confirmed about the color of your samples?. 19 In SEM you have mentioned the crystalline nature of the sample is due to spherulites, however you have not mentioned why your sample shows amorphous nature.	transition metal ions such as Cu(II) or Zn(II). 14. In this part I helped with the Pourbaix diagram to know the areas of predominance of metal ions in their different aspects. I found that the presence of tartaric acid prevents the precipitation of Cu, Zn and Pb and promotes complexation ; Indeed, there is a competition between complexation-precipitation . 15. Although this distribution coefficient is measured on a batch basis, it can be used to predict elution behavior of metal ions eluted from an ion exchange column. To separate two substances, conditions should be selected such that the distribution coefficient of one of them is low (preferably 1 or less) so that it elution from the column will be rapid, while the distribution coefficient of the other substance under the same conditions should be as large as possible (more than 10 times) so that this substance will be tightly held by the resin. 19. Surface analysis has found to be of great use in understanding the surface features of the material. The morphology of resin exhibits growth of crystals from polymer solutions corresponding to the most prominent organization in polymers
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		on a large scale such as in size of few millimeters of spherulites. Ideally, spherulites are the aggregates of submicroscopic size particles. Spherulites are characterized by secondary structural features, such as faint corrugations. The higher magnification 500$\times$ shows coexistence of an appreciable amorphous fraction with a small amount of shallow pits. The surface of the resin (Fig.3) contributes greater segments of crystalline regions. (line 221)
<u>Minor</u> REVISION comments		
<u>Optional/General</u> comments		