



Fig. 7. SEM images of the surface of the carbon electrode after adsorption of gold at different magnifications of (a) 1 μm , (b) 2 μm ; (c) optical surface image and (d) elemental analysis.

4. Conclusion

In this study, the features of gold electroreduction on the activated carbon produced from carbonized and activated RH were shown. The kinetics of electroreduction of gold ions investigated by means of cyclic voltammetry and chronoamperometry showed several important trends which haven't been adequately described before this study by other authors. It is revealed that the electrochemical reduction of gold ions occurring on the surface of the carbon sorbent is limited by diffusion, and this proves the presence of the Randles-Ševčík dependence. In this regard, the electrochemical stage, i.e. the electron transfer process proceeds quickly. Meanwhile, the charge transfer rate constant was several orders of magnitude higher than the mass transfer constant. Moreover, the optimal conditions for the process of gold adsorption on a carbon adsorbent were established. Evaluation of the features of reaction mechanism between Au^{3+} chloride complexes and activated carbon which was performed within the study, allows to control the processes of electroreduction of gold ions more precisely and to enhance the overall efficiency of this method.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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