Journal Pre-proof

Study and identification of contaminant phases in commercial activated carbons

C.F. Ramirez-Gutierrez, R. Arias-Niquepa, J.J. Prías-Barragán, M.E. Rodriguez-Garcia

PII: S2213-3437(19)30759-6

DOI: https://doi.org/10.1016/j.jece.2019.103636

Reference: JECE 103636

To appear in: *Journal of Environmental Chemical Engineering*

Received Date: 5 November 2019

Revised Date: 12 December 2019

Accepted Date: 22 December 2019

Please cite this article as: C.F. Ramirez-Gutierrez, R. Arias-Niquepa, J.J. Pr\'ias-Barrag\'an, M.E. Rodriguez-Garcia, Study and identification of contaminant phases in commercial activated carbons, *<![CDATA[Journal of Environmental Chemical Engineering]]>* (2019), doi: https://doi.org/10.1016/j.jece.2019.103636

Elsevier Editorial System(tm) for Journal of Environmental Chemical Engineering
Manuscript Draft

Manuscript Number: JECE-D-19-02202R1

Title: Study and identification of contaminant phases in commercial activated carbons

Article Type: Research Paper

Keywords: FTIR; BET; X-ray diffraction; methylene blue; charcoal

Corresponding Author: Dr. Cristian Felipe Ramirez-Gutierrez, Ph.D.

Corresponding Author's Institution: Universidad Nacional Autonoma de Mexico

First Author: Cristian Felipe Ramirez-Gutierrez, Ph.D.

Order of Authors: Cristian Felipe Ramirez-Gutierrez, Ph.D.; Rafael Arias-Niquepa, M.Sc.; Jhon J Prías-Barragán, Ph.D; Mario E Rodriguez-Garcia, Ph.D

Abstract: This work aims to identify and study contaminant phases present in commercial activated carbons (AC), also to determine the quality of the AC through methylene blue absorption. A straightforward methodology was implemented to carry out a complete characterization of AC that consists of the morphology determination by SEM, an elemental chemical composition by XRF, identification of crystalline phases using XRF, and vibrational analysis through FITR. The results showed that the primary contamination in AC is related to trace elements present in raw materials as well as residues from the activation process such as Mg, Si, P, S, Cl, K, Ca, Ti, Mn, Fe, As, Sr, and Zr. It was observed that these elements could react during all steps of AC fabrication and form crystalline compounds, mainly calcium carbonates, calcium phosphates, and silicon oxides. Moreover, gas adsorption (BET) and methylene blue (MB) removal probes show that there is no correlation between the surface area and the MB removal capability.

Research Data Related to this Submission

There are no linked research data sets for this submission. The following reason is given:
Data will be made available on request