**Implementation of the Reviewers comments**

We are grateful to the Reviewers for their time and re-reviewing of the revised article. We would like to thank Reviewer A for the comments made and Reviewer B for the comment and acceptance of the revised version of the manuscript.

**Responses to the Reviewer's A comments:**

1. Regarding the Reviewer's comment on formation of the mixed surfactants aggregates, we would like to mention that experimental confirmation of such aggregates formation at a sorbent surface is a challenging task that requires employing of complex physicochemical methods: low-angle neutron scattering, atomic force microscopy (AFM), etc., which are unfortunately not available in our lab. However, it was reported in a number of papers [Tiberg et al. Cur. Opin. Colloid Interface Sci. 2000, 4, 411; F. Tiberg J. Chem. Soc. Faraday Trans. 1996, 92, 531; Zhang and Somasundaran [4]] that surfactants can form surface aggregates at concentrations below critical micelle concentration (CMC) values at solid (hydrophobic and hydrophilic) surfaces. The reason for this is higher surfactant concentrations near a solid surface due to surface activity of the surfactants. For example, at low concentrations of sodium dodecyl sulfate (0.35×CMC), AFM measurements showed the presence of hemicylinders on graphite surface [Wanless and Ducker. J. Phys. Chem. 1996, 100, 3207.] By means of time resolved elipsometry, it was shown that nonionic polyethylene glycol monoalkyl ethers surfactants form discrete surface aggregates at bare silica at low adsorption saturation of about 0.1 [F. Tiberg. J. Chem. Soc. Faraday Trans. 1996, 92, 531]. Based on AFM data, Zhang and Somasundaran [4] reported that the structure of the aggregates of nonionic ethoxylated or cationic surfactants on silica at surfactant concentrations of about half of CMC is partially similar to the structure of the surfactants micelles in the bulk solution.

However, given the Reviewer's remark and the fact that formation of the surfactants aggregates requires additional experimental confirmation, we have removed from the text the assumption related to possible formation of mixed HDPB/Triton X aggregates at carbon black (CB) surface.

2. Regarding the Reviewer's concern on higher values of the surfactants adsorption from their mixtures compared to adsorption from single solutions of the surfactants, we would like to mention that these conclusions are based on the experimentally obtained adsorption values. The obtained data also correlate with a number of studies that reported higher surfactants adsorption from their binary mixtures than from the individual solutions. We have incorporated the corresponding additions and references [32,33,36], in which an increase of adsorption values for ionic surfactants from their mixtures with non-ionic surfactants was reported, to the revised text (pages 8,9). In particular, Zhou and Rosen[32] reported higher adsorption of anionic surfactant C4H9OPhSO3Na from the mixture with the non-ionic C12H25-N-pyrrolidone at hydrophobic polyethylene surface compared with the anionic surfactant adsorption from its single solution. Schwuger and Smolka [33] discussed that, the adsorption of ionic sodium dodecylsulfate at activated carbon surface increased in the presence of non-ionic p-octylphenol-polyglycol ethers. Ivanova et al. [36] reported increasing of the adsorption values in the mixtures of cationic dodecylpyridinium bromide with Triton X-100 at hydrophobized SiO2.

Also, at hydrophilic surfaces it was shown that in the mixed system of cationic dodecyltrimethylammonium bromide with non-ionic n-dodecyl-β-D-maltoside, adsorption of the cationic surfactant at silica at low solute concentrations increased in the presence of the non-ionic surfactant [Zhang et. al. J. Colloid Interface Sci. 2006, 302, 20]. Notably adsorption synergy was also observed in a mixture of cationic tetradecyltrimethylammonium chloride with nonionic pentadecylethylated nonylphenol (NP-15) on alumina [Huang et al. J. Colloid Interface Sci. 1996;177,222].

At the same time, taking into account the Reviewer's comments, we have removed Figure 4 and discussion related to formation of mixed HDPB/TX surfactant aggregates from the text. We will try to explore these issues in details in future studies. Instead, we have added the experimental and calculated isotherms of total adsorption of HDPB/Triton X mixtures and relevant explanation to the text (pages 9-11, Fig. 5).

3. With respect to the Reviewer's comment on Equations 7 and 8, we do acknowledge that the typo errors were made during the final preparation of the Equations, such as a missing parenthesis and an excess term χ. We apologize for that, but we can assure that the calculations were performed accordingly by the correct equations. The needed correction done to the revised Equations.

4. Regarding the Reviewer's comment on the purpose and novelty of the work. Taking into account the Reviewer‘s comment we revised the abstract/conclusions and detailed the features of mixed adsorption of HDPB and Triton X surfactants at graphitized CB surface found in this study as follows:

* It is found that the addition of Triton X surfactants increases HDPB adsorption values from HDPB/Triton X mixtures compared to HDPB adsorption from its single solution
* It is shown that the experimental values of total surfactants adsorption of HDPB/Triton X mixtures at CB are higher than adsorption values calculated based on the assumption of additivity for ideal surfactants mixtures
* It is found that the parameters of intermolecular interactions (*βs*) between HDPB and Triton X in the mixed HDPB/Triton X adsorption layer have negative values indicating the presence of attractive intermolecular interactions between the components
* It is established that composition of the mixed HDPB/Triton X adsorption layer at CB surface is notably different from the surfactants composition in the bulk solution
* It is found that the mixed HDPB/Triton X adsorption layer is enriched with Triton X molecules and the mole fraction of the non-ionic surfactant in the mixed adsorption layer increase with decreasing of ethoxylation degree of Triton X molecules.

We hope that the presented results will be of interest to the Researchers who are working in the field of adsorption from mixed surfactants solutions at hydrophobic sorbents, especially given the limited number of studies in this field.

**Responses to the Reviewer's B comment:**

As per the Reviewer B comment, needed clarifications have been incorporated to the abstract and conclusions.

The additions and changes have been made are indicated in the revised text in red.

Yours sincerely,

Olga Kochkodan