**Supplemental material**

**A novel multi-phase treatment scheme for odorous rubber effluent**

**Ashiqur Rahmana,b, Shahriar Habiba, Mustafijur Rahmana, Symon Jahan Sajiba andAbu Yousufa\***

*aDepartment of Chemical Engineering and Polymer Science, Shahjalal University of Science and Technology, Sylhet, Bangladesh.*

*bDepartment of Chemical Engineering, Lamar University, Beaumont, Texas, USA*

\*Corresponding author: Email- ayousufcep@yahoo.com

**BOD measurement procedure**

Samples were collected in triplicates from the five sampling points and each time a 20 mL sample was transferred in an 8-oz glass-coppered bottle. The bottle was filled-up with distilled water. 2 mL of manganous solution was added immediately by means of dipping the end of pipette just below the surface of the water. 2 mL of alkaline azide iodide solution was added in similar manner. Stopper was inserted (to make sure that no air was introduced) and the solution was mixed several times by inverting the bottle. A brownish-orange precipitate was allowed to settle halfway, and 2 mL of concentrated sulfuric acid was added. Stopper was added at once after the addition of acid and mixed as before to dissolve the precipitate. The solution was allowed to stand at least for 5 min. 100 mL of solution was withdrawn into a conical flask and 0.025N sodium thiosulfate was added immediately drop by drop from a burette until the yellow color almost disappeared. 2 mL of starch solution was added, and the addition of sodium thiosulfate was continued until the blue color just disappeared (any return of blue color was disregarded). Volume of sodium thiosulfate used was recorded and two-fold of this value represented the initial DO. The process was repeated after 5 days and the final DO was measured.

DO in sample (mg/L) = mL of 0.025N sodium thiosulfate used × 2

Di = initial DO of sample

Df = final DO of sample

P = decimal volumetric fraction of sample used

 BOD (mg/L) = (Di - Df) /P

**COD measurement procedure**

Samples were collected in triplicates from the five sampling point outlets and each time 1 mL sample was diluted with 250 mL distilled water and then a 20 mL of diluted sample was added to a reflux flask that contained 0.4 mercury sulfate. Glass beads followed by 10 mL potassium dichromate were added to the flask. 30 ml solution of sulfuric acid with silver sulfate was added and stirred. Additionally, ice was added to reduce the temperature. In a separate reflux flask, blank solution was prepared using distilled water instead of the sample. The flasks were connected to condenser. Reflux was done for 2 hours for the sample and 20 minutes for the blank maintaining the temperature at 75°C. Both reflux sample and reflux blank were cooled and titrated individually with potassium dichromate adding feroin indicator (3 drops) until the color turned into reddish brown from green.

B = ml ferrous ammonium sulfate for blank

S = ml ferrous ammonium sulfate for sample

N = normality of ferrous ammonium sulfate

R = ml diluted sample taken

D = dilution factor

COD (mg/L) = (B-S) × N × D × 8000 /R

**TDS measurement procedure**

Samples were collected in triplicates from the five sampling point outlets and each time a 20 mL sample was filtered using a laboratory grade filter paper that was prewashed with distilled water and dried in the oven. Filtrate was collected in a dry beaker and dried at 103°C for about 7 h. Finally, the beaker was cooled down to room temperature and weighed.

A = weight of dried residue + beaker

B = weight of beaker

Total Dissolved Solids (mg/L) = (A-B) × 10^6

**TON measurement procedure**

Samples were collected from different sampling point outlets and different volumes of samples (ranging from 2.8 mL to 200 mL) were taken separately into 500 mL Erlenmeyer flasks. Odor free distilled water was added to reach a final volume of 200 mL in each flask. A fifth flask contained only odor free distilled water. All the flasks were heated to 40-60 °C and shaken well. Proceeding from lowest to highest amount of sample water, each flask was smelt by a group of three testers. The volume of the sample in the very first flask an odor was detected by a tester was recorded.

A = the volume of sample water

TON = 200/A (expressed in the units of Dilution-to-Threshold (D/T))