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Keywords: Activated carbon fabric; Blood lead level; Battery workers **Introduction**

Activated Carbon Fabric (ACF) is a new and brous adsorbent, which has been obtained from an appropriate brous precursor by an adequate carbonization and activation process. Among various

by physical adsorption at low temperatures. Activated Carbon Fabric is a exible form of activated carbon. e precursor is carbonized in inert atmosphere a er due chemical treatment. Activation is carried out under closely controlled process parameters to get optimum properties. Finally, the product is adequately cooled before it is exposed to the atmosphere. ACF is made up of lament yarn, due to which ACF is electrically conductive and hence it can be regenerated by passing a low voltage current across the ACF surface, or by heating of ACF at 100°C for 15 to 30 min. e distribution of pore size is in the narrow range of <10 nm. Molecules of pollutants bouncing across the activated carbon fabric surface gradually lose their energy and nally come to rest on it. Due to weak bonds in the physical adsorption, molecules can be removed from the activated carbon fabric surface by providing heat energy [1].

According to tests conducted by the division of Toxicology,

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they are made up of cotton material, and snugly cover the mouth and 3 workers a er using the indigenous ACF mask (M1). e blood nose, thereby providing comfort and e ectiveness. lead level of the dworker did not rise much a er using this mask. e

6 months before providing the masks, the blood lead level was worker however, showed an increase in blood lead level, before and determined for these workers from the National Referral Centre for er the use of this mask. e last three workers were under treatment Lead Poisoning in India (NRCLPI), Bangalore. is indigenous maskfor high blood lead levels. ere was a substantial decrease in blood (referred as M1 in this study) was given to these workers and the ad before using the mask and also a er using the same in the case blood was sent to NRCLPI, Bangalore, in heparinized vacutainers. of the 6 and the 7 workers. In the case of the 8th worker, blood lead workers continued to work in the same place while using the mask evels have increased slightly a er using the ACF (M1) mask. While comparing the e cacy of the 3 types of ACF masks used ey were instructed to clean this mask, by immersing this mask (M1) in boiling water for 15 minutes. Among this group of workers, there Table 2), both M1 and M2 have helped in reducing the average blood were 3 workers who were on chelation treatment for high blood leadad levels. However, M3 has actually increased the average blood leadad levels. level. It was decided to check the blood lead level of the workers a elexel. month of using the mask.

Six months later, 7 ready to use respiratory masks were provided Activated Carbon Fabric is a new generation material with potential by HEG Ltd. ese masks are marketed by Environ Care Products for a wide range of novel applications. Capability of Activated Carbon New Delhi. In general these masks are expected to absorb obnoxious for a wide range of novel applications. Capability of Activated Carbon gases in the environment and capture the ne dust and so particles e potential uses include passive subjects such as lay public and active subjects such as traic police, farmers who spray insecticides and specifications, painters, cement and stone industry workers etc. 5 of them ton, manganese, acids, alkalis and anions such as chlorides, uorides o-pollution masks (referred as M2 in this study) and 2 were breath-o-pollution masks (referred as M3 in this study). Both these types of with reference to Table 1, in the case of the rest 5 workers, there is With reference to Table 1, in the case of the rst 5 workers, there is masks are tted with exhalation valves. ey are so, non toxic, foldable and can slip into the pocket. ey use ACF as a Iter. In the case of then increase in the blood lead levels before using the ACF (M1) mask. breath-o-pollution masks (M3), the Iter is detachable and it can be the case of the remaining 3 workers, who were on chelation, there removed for regeneration or replacement, and the external surfaceissa decrease in blood lead even before giving the ACF (M1) masks made of plastic. e mesh mask (M2) does not have a lter cartridgeSince the di erence between the rst ve and the last three is that the and the exterior is made of mesh. It can be degenerated by immerslatter was on chelation, the reduction in blood lead levels here can be the mask in boiling water for about 30 minutes. ese masks were giventtributed to chelation. to 7 workers, who was already using the previous mask (M1) which had A er using the M1 mask, there was a reduction in the blood lead

worn out by then. ey were asked to use these masks (M2 and M3) evels in the rst 3 workers implying the role of ACF for the same. As for one month, a er which their blood lead was drawn in heparinized regards the worker whose blood lead has remained constant a er vacutainers and sent to NRCLPI, Bangalore. using the mask, this mask has proved to be useful as a preventive e workers were instructed to clean the masks (M2 and M3) everymeasure. In the case of the worker, there is an unpredictable rise week by immersing the mask or the cartridge (in case of M3), in hot blood lead even a er wearing the masks. His blood lead was on the

water for 30 minutes and then dry them. is instruction was given by rise even before using this mask. is rise in blood lead even with and the authorities of HEG Ltd. as a unique property of an ACF fabric is the inthout the mask could be due to some other reason. e possibility possibility to "reactivate" the fabric when it has become saturated, that he had not used his mask regularly cannot be ruled out. that it can be used again.

Results

Chelation has been a known form of treatment for lead poisoning since many years [3]. Since the blood lead has decreased before an

Table 1 shows that there was a reduction in blood lead levels in the er using the mask in the case of those workers under chelation

Serial No	Blood Lead level taken six months before giv- ing masks "A"	Blood lead level on the day ACF mask was given "B"	Difference of blood lead before using mask "B-A"	Blood lead level one month after ACF mask was given "C"	Whether on treatment	Difference in Blood lead level after using mask "B-C"
1	68.6	77.9	+9.3	67.1	No	-10.8
2	69.3	77.6	+8.3	74.1	No	-3.5
3	75.6	82.9	+7.3	80.3	No	-2.6
4	59.7	65	+5.3	65.1	No	+0.1
5	66.6	80.3	+13.7	91.8	No	+11.5
6	116.6	91.5	-25.1	76.5	Yes	-15
7	109.1	100.9	-8.2	74	Yes	-26.9
8	101.6	78.3	-23.3	80.1	Yes	+1.8

Table 1: Effect of ACF mask (M1) on blood lead level on battery workers.

Mask	Average Blood Lead before giving mask	Average Blood Lead after giving mask	Difference (%)
M 1	75.26 μg/dl	70.83 μg/dl	-5.9
M 2	82.95 μg/dl	74.1 μg/dl	-10.7
M 3	67.25 μg/dl	71.05 µg/dl	+5.7

Table 2: Effect of ACF masks (M1, M2, M3) on average blood lead levels.

Page 3 of 3

(except in the case of the Worker who showed a slight increase a er using the mask), the ACF mask used here, seems to act like a preventive measure for checking lead poisoning.

According to a study on the e ect of chelation on children, the lead which is once deposited in the brain is eliminated very slowly because of its half-life of 2 years in the brain. Moreover, once in the brain, lead cannot be removed by chemical chelating agents. us, it is clear that the only way to prevent lead poisoning is to prevent lead from getting