Air Pollution in Industrial Area

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Abstract— *Large scale industrialisation increases the production of materials and urbanisation leads to the creation of mega cities where there is a tremendous increase in the number of industries, Vehicles and vehicular traffic. The ill effects of these activities are reflected in the form environmental problems. one such problem is the deterioration of urban air quality in India and other developing countries. Air pollution causes eye irritation .lung cancer, asthma, brochchetisis etc which reduces the efficiency at work. Epidemiological studies showed there is a significant association between the conce3ntration of air pollution and adverse health impacts (ostro.et.al 1945, MJA 2004) lack of opportunities for gainful employment, drought prone problems Flourosis problem associated with the drinking water quality in Telenagana state has led to ever increasing population migration of poor from rural areas resulted in urban slums which exert pressure on the environmental resources of the city. Taking that factor into consideration present carried out research study by carrying out studies in the industrial area of Hyderabad and developed a controlling technology for removal of air pollutant sulphurdioxide.*

Keywords— Air pollution, solar, health.

I. INTRODUCTION

The natural resources that support life are air, water, soil and solar energy. Air is considered as the most essential resource for the survival of habitation but it is polluted in one way or another. A.P. Govt. Created six industrial estates in a 36 mile radius from Hyderabad. The largest was a 440 hectare estate in Patancheru, some of the biggest bulk drugs and pharmaceutical industries in A.P. are located in this area. Patencheru is a classical example which is critically air polluted. CPCB in consultation with state pollution control boards has identified 22 critically polluted areas in the country for the control pollution. Patancheru is one among them. The primary air pollutants that have been identified are mercaptans, suspended particulate matter, Sulphur dioxide, Hydrogen, Sulphide, Chlorines and Organophosphates.

II. MATERIAL AND METHOD

The present study deals with analysis of air pollutants. Envirotech APM- 410 high volume analyzer is used for measuring particulate matter. Envirotech APM-412 system with a set of impinges is used. The air sampling is done in the north of plant towards patancharu village and south of a plant.

Adsorption of SO_2 by various adsorbents [1-10] is studied by batch adsorption process. These results are given in Table III.

III. RESULTS & DISCUSSION

TABLE-1
EMISSION OF AIR POLLUTANTS IN THE YEAR 2006-2007 IN DEC., JAN. AND FEB. MONTHS

S.No.	Name of Air Pollutant	Dec	Jan	Feb
1	$SO_2(\mu g/m^3)$	128.92	150.6	112.59
2	$H_2S(\mu g/m^3)$	-	-	-
3	$SPM(\mu g/m^3)$	620	337	618.34

TABLE-II
EMISSION OF AIR POLLUTION IN THE YEAR 2007 (MARCH AND APRIL)

S.No.	Name of air Pollutants	Towards the wind	Opposite wind	Towards wind	Opposite wind
1	$SO_2(\mu g/m^3)$	89.96	58.09	189.16	199.46
2	$H_2S(\mu g/m^3)$	-	-	-	-
3	$SPM(\mu g/m^3)$	226.27	93.68	428.6	692.48

TABLE-III
PERCENTAGE REMOVAL OF SO2 WITH DIFFERENT ADSORBENTS

S.No.	Conc. of SO_2 $\mu g/m^3$	Brick powder	Sawdust	Concrete	Alum Shudge	Gypsum	Merble Chips	MnO_2	Mg CO_3	Dolamite	Alumina
1	26	10	12	20	100	100	100	60	60	50	70
2	52	6.6	8	16.6	100	86.5	90	40.9	40	50	75
3	78	6.6	7	6.6	100	86	80	42.4	30	22.8	60
4	104	-	-	-	100	85	70	42.4	45	25	50
5	130	-	-	-	100	85	75	30.6	44	28	20
6	156	-	-	-	100	85.6	56	27.5	16.6	52.8	95
7	182	-	-	-	98.1	84	51	24.6	15.7	30.5	19.8
8	208	-	-	-	94.6	82	42.8	16.2	17.5	26.2	17.2
9	234	-	-	-	88	88	21.2	-	-	-	-
10	260	-	-	-	88	88	19	-	-	-	-

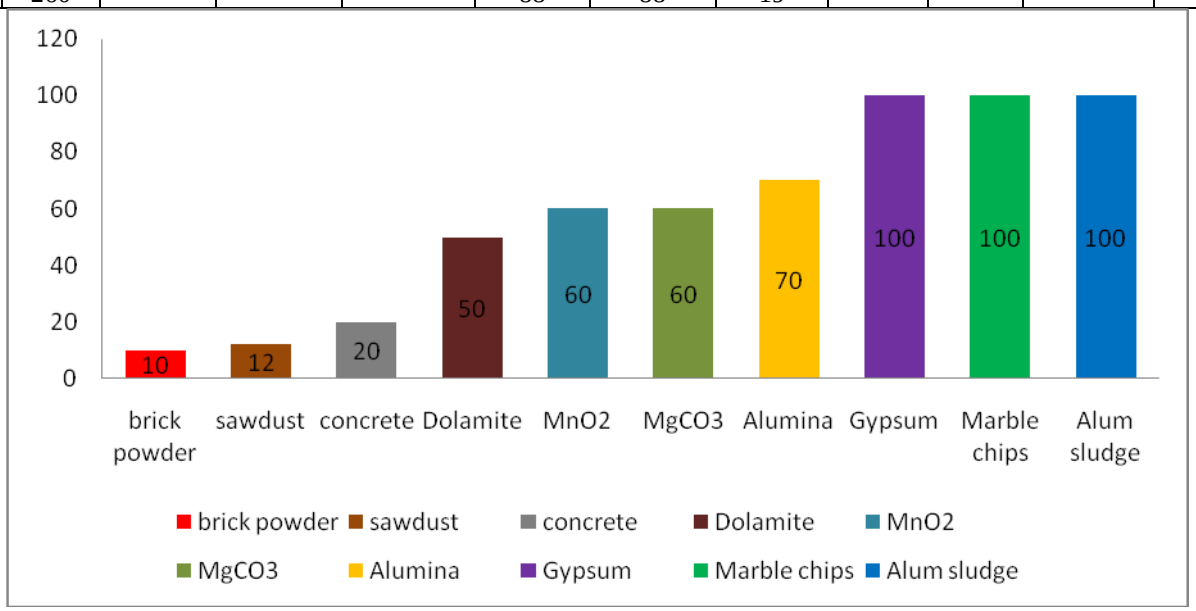

FIGURE- I ORDER OF EFFECTIVENESS OF THE ADSORBENTS

IV. DISCUSSION

From table – I and Table-II, it is observed that SO_2 and SPM is above the permissible Limit.

H_2S is converted into useful by product known as sodium hyposuilhide. It is found from table1 and table 2 gypsum, alum sludge, iron ore and marble chips have 100% to adsorb capacity to adsorb SO_2 at lower concentrations. Even though magnesium carbonate, brick powder, concrete powder sawdust has a large surface area but it s having less capacity to adsorb SO_2, . brick powder[5] develops a porous structure due to the excess of heating it does not have any chemical affinity with SO_2. So it is adsorbing 10% of 26mgs.Even though sawdust [1-2], is used for controlling SO_2 it is adsorbing 12% of SO_2 which indicates that not only the surface area and amorphous structure but also other factors will influence the adsorption process.

Alum is used in water treatment plants. During this process alum converts into Aluminium hydroxide and these flocs gather considerable amount of clay slit and many other suspended particulate material which is becoming a problem to water works manager. So it is used in controlling SO_2.Aluminium hydroxide reacts with SO_2 and forms aluminum sulfate.

MnO_2 is ampherotic in nature and is a good oxidizing agent and it can easily take up an atom of oxygen. So due to oxidizing nature and ampherotic nature it behaves as a base and it reacts with acidic gas SO_2. During this reaction manganese sulfate is formed. Alumina or aluminum oxide reacts also reacts with SO_2 and forms aluminum sulfate.

During the process of formation of gypsum crystals [6], they must have adsorbed water molecules, which are accompanied by the contraction in volume. During this process adsorption complex must have formed due to physical or chemical forces.

Partial dehydration of gypsum must have lead to incomplete crystal structure with the residual forces on the surface. Due to this reason gypsum has developed certain binding forces and it has capacity to adsorb SO_2 molecules. Physical forces and vanderwaals forces are adsorbing SO_2 molecules.

A marble chip is an ore of calcium carbonate and dolomite is an ore of calcium carbonate and magnesium carbonate. .Marble chips adsorb 100 % of SO_2 and dolomite adsorbs 50% of SO_2. Along with the marble chips [12-14] and dolomite, magnesium carbonate is also tested for comparative study. Calcium carbonate, magnesium carbonate and belongs to IIA group carbonates. These carbonates are highly stable and inert substances calcium carbonate, magnesium carbonate and dolomite react with the SO_2 to form its sulfates at a very high temperature. The calcium carbonate and magnesium carbonate decomposes to calcium oxide and carbon dioxide. This takes place at a high temperature and as the experiments are carried out at room temperature, chemical reaction is not taking place only physical forces are holding the SO_2 molecules .Dolomite has a capacity to adsorb SO_2 molecules.

V. CONCLUSION

Adsorption of SO_2 by various waste materials can take care of air pollution caused due to SO_2 every industry has to establish pollution control equipments to check and control these air pollutants.

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