



The regeneration of polluted active carbon by radiation techniques

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Active carbon is already used during many years for removal of organic pollutants from different wastes. However, it lost the sorption capacity after some working period and should be regenerated periodically. The traditional method of regeneration is the treatment in special ovens at 900--1000°C. In this case the absorbed pollutants will escape from active carbon into air. Also high temperature operation is a big problem in large scale.

In 1972 the low temperature method of destructing organic substances absorbed at carbon surface by irradiation was proposed by Case and Ketchen[1]. However, because the concentration of the pollutants was too high, the low temperature regeneration was not a continuous process. Shubin and others (1980) found that considerably better results can be obtained by combination of radiation treatment with biological and chemical treatment [2]. They further observed that for the maintenance of absorption activity of the carbon at sufficiently high level the wastes were passed through column under continuous irradiation of active carbon by ^{60}Co γ -rays.

Active carbon is also popularly used for treatment of industrial and municipal waste in China. The most difficulty for its use in large scale is limited absorption capacity and high temperature in its regeneration. We are starting our work on municipal waste water in batch manner. First the polluted active carbon is treated by irradiation, then waste water is passed through irradiated active carbon and analysis for oxidization, transparency, COD,

PH and bacteria has been made. The active carbon without irradiation has been used for comparison. Both ^{60}Co γ -ray and electron beam used as irradiation sources. Some parameters which should effect treatment efficiency (such as dose rate, total dose et al) have been tested. On batch basis, continuous radiation-absorption method has been carried out. In this case, waste water is passed through active carbon column under the condition of continuous irradiation of sorbent by ^{60}Co γ -ray and electron beam. After the irradiation, waste water is analyzed. Some experiment without irradiation is also needed for comparison. Our work is still in progress.

[1] Case F.W. and Ketchen E.E., French Patent (1973), 2179129(A).

[2] Shubin V.N., Brusentseva S.A., Nikonorova G.K., Zhurn. Fiz. Khim.,1980, 54:2557.