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CHARACTERISATION OF ACTIVE CARBONS: PART II

REPORT NO. RD.461-R

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Research & Development Establishment,
British-American Tobacco Co. Ltd.,
SOUTHAMPTON.

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CHARACTERISATION OF ACTIVE CARBONS: PART II

(Report No. RD.461-R)

SUMMARY AND CONCLUSIONS

Adsorption isotherms of five substances on various active carbons were measured. For each carbon, adsorption capacities and surface areas were calculated.

An attempt was made to correlate adsorption properties with cigarette smoke filtration efficiencies for the same substance on the same carbon. There was no direct relationship between any single adsorption parameter and the filtration efficiency. Thus it was concluded that the presence of other smoke components affects the filtration of any single component. Two factors may contribute to this effect:

(1) Multicomponent physical adsorption: The adsorption of any smoke component is strongly influenced by the physical adsorption of other components. The multicomponent adsorption theory of Myers and Prausnitz (5) leads to prediction of selective adsorption from mixtures of hydrogen sulphide and acetaldehyde which are in qualitative agreement with filtration efficiencies measured using cigarette smoke.

(2) Chemical reaction between smoke components on the carbon surface: For example, hydrogen sulphide reacts with air to produce elemental sulphur on the surface of carbon.

Further work is planned to investigate these two effects in more detail in order to achieve a better understanding of the selective filtration obtainable with carbon, and with the ultimate aim of designing filters with specific selective properties.

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