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Elementary Plasma Reactions of Environmental Interest

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Plasma-Materials Interactions and Impurity Control in Magnetically Confined Thermonuclear Fusion Machines*

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Progress achieved in plasma heating and magnetic confinement during the past decade has brought to the fore a number of problems which have to be solved if controlled thermonuclear fusion is to become an economically and environmentally acceptable energy source. Among them, the interactions of plasmas with solid surfaces represent a very serious obstacle to the achievement of a positive energy balance in the next generation of magnetic fusion devices. In present devices, plasma energy losses are dominated by radiation due to impurities released from the limiter and the vacuum vessel wall. The processes leading to impurity release are complex and still poorly understood, as are the mechanisms of impurity transport. The present chapter summarizes the status of this field at the beginning of 1979. The various elementary processes are discussed and an attempt is made to point out problems towards which future research has to be directed. Various approaches suggested up to now for impurity control as well as potential solutions to the materials erosion problem are discussed. Clearly, the elucidation of plasma-materials interactions presents a challenge to a broad spectrum of chemists, physicists and materials scientists.

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Preparation of Optical Waveguides
with the Aid of Plasma-Activated Chemical Vapour Deposition at Low Pressures

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