INCANDESCENT LAMPS WITH A FLUORINE CYCLE AND FILAMENTS OF TUNGSTEN OR CARBON

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Tungsten-bromine or iodine lamps are now approaching the maximum performance that can be expected from commercially available tungsten wire and within the accuracy of present filament making equipment. To date, the development of a defect-healing tungsten-fluorine cycle holds the greatest promise for the immediate future, and with the innovation of a fluorine and fluoride resistant coating to protect the lamp envelope, the protection of the cooler regions of the filament, the prevention of the disproportiona tion blackening of lower tungsten fluorides and the control of the quantity of free fluorine throughout the life of the lamp, the principal technological problems seems to be solved.
Although alternative materials with a higher melting point than that of tungsten are available, as yet, none satisfies the additional essential criteria for a filament material, especially of low vapour pressure. This means that under the same operating conditions, the bulb wall of a tungsten filament lamp does not blacken nearly as quickly as that of a carbon-filament lamp. Nethertheless, the carbon-filament lamp does have its virtues. Much more information is now available about the various kinds of carbon. Also there is the question of possible shortage of materials; there is some risk of this with tungsten, but not with carbon. Therefore we used the chemical transport reactions between elementary carbon and carbon fluorine species to retransport the carbon evaporated from the filament. These processes are discussed and compared with the tungsten fluorine cycle in an incandescent lamp.