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METHOD OF PRODUCING CATHODE MATERIALS

Felix Herriger, Berlin, Germany, assignor to C. Lorenz Aktiengesellschaft, Berlin-Tempelhof, Germany, a company

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3 Claims. (Cl. 250—27.5)

This invention relates to methods of producing cathode materials and consists in certain features of novelty which will be readily understood from the following and be pointed out in the appended claims.

It is a known fact that the electron emissive performance of thoriated tungsten cathodes on account of the absorbed mono-atomic molecular layer of thorium is lower than if the cathode is made of pure tungsten. It is also familiar to those skilled in the art that even thoriated tantalum cathodes do not give any increase with respect to the electron emission performance since the two elements thorium and tantalum are classified in the same group or family of the periodic system, from which follows that the dipole momentum, which inherently contributes toward a reduction of the electron emission performance, assumes a very low value.

Careful investigations made by applicant have proven that the dipole momentum still may be increased. This is accomplished according to this invention by replacing the bearing cathode element tungsten by rhenium which also possesses a very high melting point. The dipole momentum between the elements thorium and rhenium is considerably higher than between thorium and tungsten, so that the electron emission performance is proportionately reduced. This effect is causitive to the classification of thorium and rhenium in the periodic system.

Although the rhenium does not form any carbide, it involves such high absorption properties with respect to thorium that no appreciable evaporation of the thorium from its superficies will take place at normal operating temperatures of say 1800 degrees centigrade.

The manufacture of thoriated rhenium cathodes is similar to that of thoriated tungsten cathodes. To the metallic rhenium powder there is added up to 10 per cent of powdered rhenium oxide. This mixture is first compressed at a high pressure and then sintered in a protective gaseous atmosphere, whereupon the resulting blocks are hammered to the desirable shape and size.

What is claimed is:

1. The method of producing cathode materials which comprises mixing metallic rhenium powder and an additional amount up to 10 per cent of pulverized thorium oxide, compressing the resulting mixture at high pressure, and sintering the compressed compound in a protective gaseous atmosphere.

2. The method of producing cathodes for electron discharge devices which comprises mixing metallic rhenium powder and an additional amount of up to 10 per cent of pulverized thorium oxide, compressing this mixture at high pressure, sintering the compressed compound in a protective gaseous atmosphere, and hammering the resulting blocks to the desirable shape and size.

3. As a product of manufacture, a cathode for electron discharge devices consisting of rhenium and an additional amount of up to 10 per cent of thorium.

FELIX HERRIGER.