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MOLYBDENUM ALLOYS

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This invention relates to improvements in molybdenum base alloys.

It is the object of the invention to provide a material which possesses superior physical properties such as high specific gravity and satisfactory strength. Such a material is suitable for X-ray targets.

It is also an object of the present invention to provide a contact material of superior properties.

It is a further object of the invention to provide a material of high melting point and high recrystallization temperature.

Other objects of the invention will be apparent from the following description taken in connection with the appended claims.

The present invention comprises a combination of elements, methods of manufacture and the product thereof brought out and exemplified in the disclosure hereinafter set forth, the scope of the invention being indicated in the appended claims.

While a preferred embodiment of the invention is described herein, it is contemplated that considerable variation may be made in the method of procedure and the combination of elements without departing from the spirit of the invention.

According to the present invention an improved alloy is contemplated, having the following ingredients present in substantially the ranges of proportion given below:

	Per cent
Molybdenum	60 to 99.75
Osmium	.01 to 1

We have found that it is possible to produce molybdenum base materials containing up to 1% of osmium, part of which is taken out by molybdenum in solid solution and part of which exists as a free constituent, the bonded alloys showing increased hardness and considerable resistance to abrasion. Osmium is suitable as an alloy element for molybdenum because it has a melting point similarly high, the actual melting temperature being about 2700° centigrade while the boiling point is in the neighborhood of 5000° centigrade. Osmium in molybdenum can be sintered by heating to a temperature of about 2000° centigrade. Since the oxide of osmium can be readily reduced by hydrogen, the sintering can be carried out in a hydrogen atmosphere. It is also possible to produce molybdenum of high density by

sintering only if small additions of osmium are being made. In our experiments we have found that alloys up to approximately $\frac{3}{4}$ to 1% of osmium in molybdenum can be manufactured by mixing the powders, subjecting same to a high pressure to form an ingot. The ingot or special shapes then may be sintered and forged or swaged, rolled or drawn to a convenient shape from which the various parts can be manufactured, for which this alloy is particularly suitable. It is understood that one or more of the ingredients can be present originally in the form of chemical compounds and can be reduced together to the metallic state. Binary alloys containing more than 1% of osmium are difficult to swage and must be manufactured by sintered process only. This swaging difficulty, however, can be overcome if other elements of the tungsten group are added. The desirable characteristics described above will not be disturbed if small proportions of other ingredients are present from the iron group materials such as iron-cobalt and nickel or small percentages of tantalum, columbium, chromium and manganese.

We can use our new alloying composition as a refractory base for a material composition consisting of molybdenum containing substantial quantities of osmium impregnated with low melting point materials taken from the group copper, silver, gold, platinum and palladium and their alloys.

Since certain changes in producing the above alloy and certain modifications in the composition which embody the invention may be made, without departing from its scope, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limited sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention, which as a matter of language might be said to fall therebetween.

What is claimed is:

1. An alloy formed of .01 to 1% osmium and the balance substantially all molybdenum.
2. An electric contact formed of an alloy of .01 to 1% osmium and the balance substantially all molybdenum.

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