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Gas-discharge lamp

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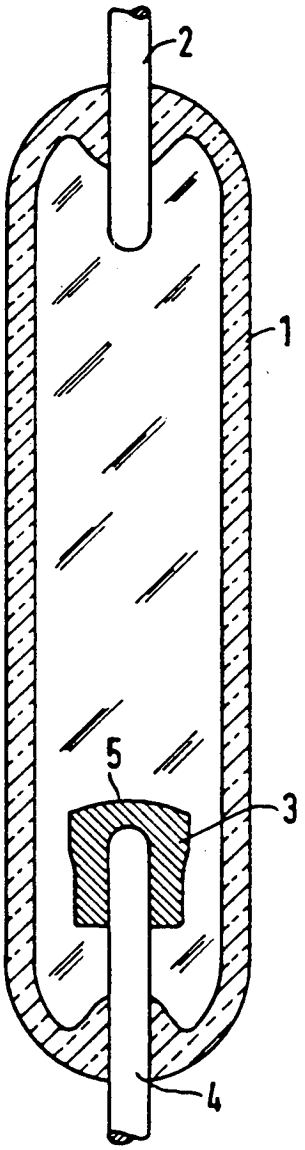

GAS-DISCHARGE LAMP

This invention relates to a gas-discharge lamp which contains two electrodes in a gas-filled light transparent housing, with the cathode being provided by a connection wire fitted through the housing in vacuum-tight manner and a cathode body fixed thereto.

It is known to form the cathode as a porous sintered metal body. Salts of alkali or alkaline earth metals are taken up by the pores of the sintered body. Accordingly the following requirements are placed on the sintered body:

1. The porosity should be as large as possible in order to offer a large surface to the alkali or alkaline earth metal salts.
2. Its strength should be as high as possible, and in particular, no particles should come away from the cathode when operating the lamps, (flash discharges).
3. The ductility and shear strength should be as high as possible if the cathodes are generally to be fixed in mass production by mechanical pressing on to the current supply wire and accordingly strongly deformed.
4. The metals used should have a high melting point.
5. The metals used should have a high affinity (Getter effect) for O_2, H_2, CO, CO_2.

Understandably, as a result of partially contradicting requirements, only a compromise may be achieved by mixing several pure metal powders.

According to the present invention, there is provided a gas-discharge lamp, which contains two electrodes in a gas filled light transmissive housing, the electrode which is to act as a cathode being formed from a connecting wire led through the housing in a vacuum tight manner and a cathode body fixed thereon, which cathode body is a sintered body formed of the elements Ti, V and one or both of Ta and Nb and has a

particle size $\leq$ 50 µm, with Ti being present in an amount of at least 40% and V being present in an amount of at least 10%.

For a better understanding of the invention and to show how the same can be carried into effect, reference will now be made, by way of example only, to the accompanying drawing:

With the flash lamp shown in the drawing, an anode 2 and a cathode are fused into a transparent housing 1 formed of quartz or hard glass. The cathode is composed of a cathode body 3 and a connection wire 4, with the cathode body 3 being fixed to the connection wire 4 by pressing on.

The cathode body 3 is a sintered body made from a mixture of metal powders. The mixture of metal powders consists of at least three of the four pure metals Ti, Ta, Nb, V and has a particle size $\leq$ 50 µm, with Ti having a weight content of at least 40% and V a weight content of at least 10%. The following mixtures have been successfully investigated (all amounts in % by weight):

1a.	Ti	Ta	V	
b.	50	20	30	
c.	50	30	20	
d.	60	30	10	
e.	60	20	20	
2a.	Ti	Nb	V	
b.	40	30	30	
c.	40	40	20	
d.	50	40	10	
3a.	Ti	Ta	Nb	V
b.	40	10	20	30
c.	50	10	30	10
d.	50	10	20	20

A good compromise for porosity, strength and ductility was obtained with each of the indicated mixing ratios. Furthermore all four of the elements Ti, V, Ta and Nb are high melting metals and have good Getter

properties. The following advantageous results have been obtained with flash tubes constructed with the above indicated cathodes:

1. 15% higher light yield, in particular in comparison to Ni-basis-cathodes.
2. 10% lower blackening after the required length of use.
3. 20% higher specific capacitance.
4. 10% lower blackening after the required period of use.
5. 80% less attrition in use on account of loosened cathode particles and optical defects.
6. Reduction in the so-called "noise" (that is a high frequency disturbance on initiation of ionisation).

Claim

1. A Gas-discharge lamp, which contains two electrodes in a gas filled light transmissive housing the electrode which is to act as a cathode being formed from a connecting wire led through the housing in a vacuum tight manner and a cathode body fixed thereon, which cathode body is a sintered body formed of the elements Ti, V and one or both of Ta and Nb and has a particle size $\leq$ 50 µm, with Ti being present in an amount of at least 40% and V being present in an amount of at least 10%.

2. A gas-discharge lamp as claimed in claim 1, wherein the cathode body is pressed onto the connecting wire.

3. A gas-discharge lamp, substantially as hereinbefore described with reference to, and as shown in the accompanying drawing in conjunction with the cathode body being formed of any one of mixtures 1a to 1e, 2a to 2d and 3a to 3d set out herein.

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Gas-discharge lamp

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