BRIEF SUMMARY OF THE INVENTION

[0011] The invention is based on the object of providing a lamp module with a deuterium lamp having an ozone filter that exhibits a long service life, that can be manufactured economically, and that ensures a high intensity in the wavelength range of 190 nm to 250 nm.

[0012] Starting with a deuterium lamp of the generic type mentioned at the outset, this object is achieved according to the invention in that a VUV edge filter is provided in the beam outlet opening and on the side of the optical transmission element facing the deuterium lamp.

[0013] In the deuterium lamp according to the invention, a lamp bulb made of synthetic quartz glass is used that ensures excellent UV transmission even in the short-wave range up to approximately 150 nm. The VUV edge filter absorbs the short-wave UV radiation having wavelengths less than 190 nm, which otherwise could lead to ozone formation outside of the lamp module. A corresponding coating of the quartz glass lamp bulb with an ozone filter can therefore be eliminated. Thus, there are many possibilities for arranging the lamp bulb in the housing or lamp receptacle body of the lamp module. The quartz glass lamp bulb is thus a standard component that represents an economical component for the production of the lamp module. The abbreviation VUV stands for Vacuum Ultraviolet and designates the spectral range from approximately 100 nm up to approximately 190 nm.

[0014] Because the lamp bulb is surrounded by the lamp receptacle body and has a seal against the outside air, only a small air volume is enclosed between the quartz glass bulb and the housing interior. In this narrow, limited space, ozone formation due to the short-wave radiation emitted from the quartz-glass bulb is possible and leads very quickly to a saturated atmosphere there, which is hardly exposed to convection and therefore has no effect on the stability of the radiation emerging from the lamp module.

[0015] Of decisive importance is that, due to the VUV edge filter arranged in the beam outlet opening, ozone formation is prevented by sharp filtering out of the wavelength range less than 190 nm in the external environment of the lamp module. The filter therefore exhibits high transmission in the wavelength range above 190 nm, so that the spectrum usable for spectral-analysis purposes is nevertheless large enough for most applications for the lamp module according to the invention.

[0016] Due to the arrangement of the filter with a spacing from the surface of the quartz glass bulb, this is exposed to a low thermal load, which significantly increases its service life and thus also that of the entire lamp module.

[0017] The optical transmission element closing the beam outlet opening involves, for example, condenser lens or a simple disk, which acts merely as an optical window.

BRIEF SUMMARY OF THE INVENTION

[0011] In accordance with a first aspect of the present invention, there is provided a lamp module comprising a lamp receptacle body having a cavity receiving a deuterium lamp having a lamp bulb made of synthetic quartz glass, the cavity having a beam outlet opening closed with an optical transmission element, and a VUV edge filter located in the beam outlet opening on a side of the optical transmission element facing the deuterium lamp.

[0011a] The example embodiments of the present invention seek to provide a lamp module with a deuterium lamp having an ozone filter that exhibits a long service life, that can be manufactured economically, and that ensures a high intensity in the wavelength range of 190 nm to 250 nm.

[0012] Starting with a deuterium lamp of the generic type mentioned at the outset, a VUV edge filter may be provided in the beam outlet opening and on the side of the optical transmission element facing the deuterium lamp.

[0013] In the deuterium lamp according to the example embodiments, a lamp bulb made of synthetic quartz glass is used that ensures excellent UV transmission even in the short-wave range up to approximately 150 nm. The VUV edge filter absorbs the short-wave UV radiation having wavelengths less than 190 nm, which otherwise could lead to ozone formation outside of the lamp module. A corresponding coating of the quartz glass lamp bulb with an ozone filter can therefore be eliminated. Thus, there are many possibilities for arranging the lamp bulb in the housing or lamp receptacle body of the lamp module. The quartz glass lamp bulb is thus a standard component that represents an economical component for the production of the lamp module. The abbreviation VUV stands for Vacuum Ultraviolet and designates the spectral range from approximately 100 nm up to approximately 190 nm.

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[0016] Due to the arrangement of the filter with a spacing from the surface of the quartz glass bulb, this is exposed to a low thermal load, which significantly increases its service life and thus also that of the entire lamp module.

[0017] The optical transmission element closing the beam outlet opening involves, for example, a condenser lens or a simple disk, which acts merely as an optical window.