EFFECTIVE EXCILAMPS EXCITED BY A CAPACITIVE DISCHARGE

**Description**
Excilamps are electric-discharge sources of spontaneous ultraviolet radiation generated due to decay of excimer or exciplex molecules. The emission spectrum consists of one or several narrow bands, and the band maximum is at the wavelength corresponding to emission of a chosen working molecule. The wavelength of KrCl*, XeCl*, XeI*, and XeBr* molecules are listed below.

<table>
<thead>
<tr>
<th></th>
<th>KrCl*</th>
<th>XeI*</th>
<th>XeBr*</th>
<th>XeCl*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength (nm)</td>
<td>222</td>
<td>253</td>
<td>289</td>
<td>308</td>
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</table>

Various types of discharge are used for excilamps. Excilamps excited by a capacitive discharge were first developed at the Laboratory of Optical Radiation of the Institute of High Current Electronics of the Siberian Branch of the Russian Academy of Sciences.

![Fig. 1. Capacitive-discharge XeBr excilamp with a mean radiation power of 8 W.](image1)

![Fig. 2. Capacitive-discharge KrCl excilamp with a mean radiation power of 9 W.](image2)

**Technical appraisal and economic benefits**
- Simple structure (cylindrical or U-shaped);
- High power parameters (mean radiation power up to 10 W with efficiency up to 25% of the power input);
- Narrow radiation bandwidth (smaller than 10 nm);
- Small size (up to 50 cm);
- Long lifetime (greater than 1000 hours).

Excilamps do not contain ecologically hazardous mercury; hence, utilization of sources of light out of service, in contrast to utilization of conventional mercury lamps, becomes a safe procedure.

**Application area**
- Destruction of various pollutants (phenol and phenolates);
- Sterilization of drinking water;
- Analysis of the quality of environment and foodstuff (presence of toxic elements).

Excilamps can also be used to organize various photoprocesses, such as
- Deposition of thin metal films;
• Photodeposition of amorphous semiconductors;
• Photodeposition of thin dielectric layers;
• Photoetching of polymers;
• Low-temperature oxidation of organic substances.

**Development stage**
Laboratory samples are available. Samples of KrCl, XeCl, XeI, and XeBr excilamps have been developed and tested.

**Patent situation**
There are six patents of the Russian Federation.

**Commercial offers**
- Investment agreement for commercialization of the product;
- Production and procurement contract;
- License agreement.

**Estimated cost**
The estimated cost of one excilamp with a power source is 30,000 roubles.

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