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excimer lamp

Non-coherent source of *ultraviolet* radiation capable of producing quasi-monochromatic radiation from the near UV ($\lambda = 354$ nm) to the vacuum UV ($\lambda = 126$ nm). The operation of the excimer lamps relies on the radiative decomposition of *excimers* or *exciplexes* created by various types of discharges.

Notes:

1. Using noble gas, halogen, or noble gas / halogen mixtures with fill pressure ~ 30 kPa, the radiative decomposition of the excimer or the exciplex produces nearly monochromatic radiation. Some of the commercially available wavelengths for the particular excimers or exciplexes are 126 nm with Ar_2, 146 nm with Kr_2, 172 nm with Xe_2, 222 nm with KrCl, and 308 nm with XeCl, obtained with efficiencies of 5 - 15 %. Pulsed Xe-excimer (Xe_2) lamps may have up to 40 % efficiency. Good efficiencies are also obtained with XeBr at 291 nm and with XeI at 253 nm. Other wavelengths produced with much less efficiency are 207 nm (KrBr), 253 nm (XeI), 259 nm (Cl_2), and 341 nm (I_2) (see Table 1).

   Table 1: Peak wavelengths (nm) obtained in dielectric-barrier discharges with mixtures of noble gas (Ng) and halogen (X_2). Wavelengths of commercially available lamps are shown in boldface type. The molecular species indicated are excimers or exciplexes.

	X_2	Ne	Ar	Kr	Xe
Ng_2			**126**	**146**	**172**
F	157	108	193	249	354
Cl	259		175	**222**	**308**
Br	291		165	207	283
I	341			190	253

2. Phosphors are used to transform the UV radiation into visible radiation. This is the basis of mercury-free fluorescent lamps and of flat plasma-display panels with a large screen.

Source:

PAC, 2007, *79*, 293 *(Glossary of terms used in photochemistry, 3rd edition (IUPAC Recommendations 2006))* on page 335

