doi:10.1351/goldbook.B00626

Beer–Lambert law (or Beer–Lambert–Bouguer law)

The absorbance of a beam of collimated monochromatic radiation in a homogeneous isotropic medium is proportional to the absorption path length, l, and to the concentration, c, or — in the gas phase — to the pressure of the absorbing species. The law can be expressed as:

$$A = \log_{10}\left(\frac{P_\lambda^0}{P_\lambda}\right) = \varepsilon\, c\, l$$

or

$$P_\lambda = P_\lambda^0\, 10^{-\varepsilon\, c\, l}$$

where the proportionality constant, ε, is called the molar (decadic) absorption coefficient. For l in cm and c in $\mathrm{mol\,dm^{-3}}$ or M, ε will result in $\mathrm{dm^3\,mol^{-1}\,cm^{-1}}$ or $\mathrm{M\,cm^{-1}}$, which is a commonly used unit. The SI unit of ε is $\mathrm{m^2\,mol^{-1}}$. Note that spectral radiant power must be used because the Beer–Lambert law holds only if the spectral bandwidth of the light is narrow compared to spectral linewidths in the spectrum.
See: absorbance, extinction coefficient, Lambert law

Source:
PAC, 1996, *68*, 2223 *(Glossary of terms used in photochemistry (IUPAC Recommendations 1996))* on page 2230

See also:
PAC, 1988, *60*, 1449 *(Nomenclature, symbols, units and their usage in spectrochemical analysis - VII. Molecular absorption spectroscopy, ultraviolet and visible (UV/VIS) (Recommendations 1988))* on page 1452
PAC, 1990, *62*, 2167 *(Glossary of atmospheric chemistry terms (Recommendations 1990))* on page 2176

