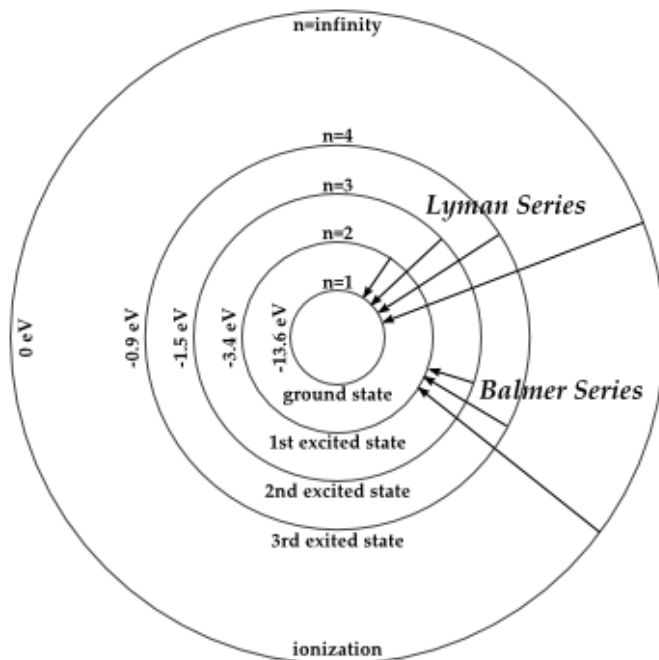
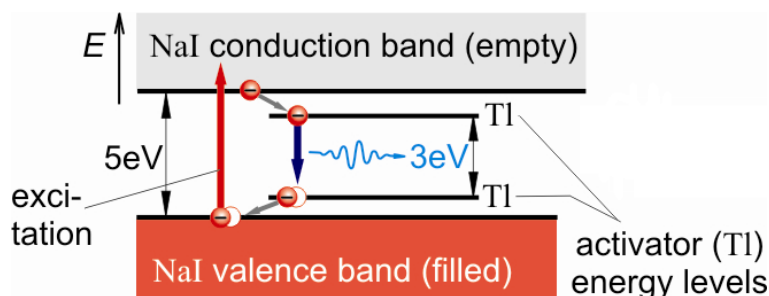


## Light emission

- 2.45. The visible range of the electromagnetic spectrum spans from 400 to 800 nm. Which energy range (in eV units) corresponds to this wavelength range?
- 2.56. The emission spectrum of thermally excited sodium atoms practically consists of a single intensive line at 589 nm wavelength. What is the energy difference (in eV units) between the excited and ground states of the sodium atom?
- 2.57. The emission spectrum of the lithium atom consists of a single red line at 671 nm wavelength. What is the energy difference (in eV units) between the excited and ground states of the lithium atom?
- 2.58. The following figure shows the possible energy states of the hydrogen atom. The electron of an excited hydrogen atom relaxes in two steps from the *M* shell: first to the *L* shell, then to the *K* shell; a light photon is emitted in both steps. What are the wavelengths of the emitted photons? What type of light do these wavelength correspond to?



- 2.59. The following figure shows the energy structure of the NaI(Tl) crystal. What is the wavelength of the light which is emitted during the electronic relaxation between the thallium energy levels of the NaI(Tl) crystal? What is the color of this light?



## **Solutions**

2.45. **1.55 – 3.1 eV**

2.56. **2.11 eV**

2.57. **1.85 eV**

2.58. **654 nm, i.e. visible red light; and  
122 nm, i.e. far UV (or UV-C)**

2.59. **414 nm, i.e. blue light**