Liquid scintillation counters

Liquid scintillation counting (LSC) is the standard laboratory method to quantify the radioactivity of low energy radioisotopes, mostly beta-emitting and alpha-emitting isotopes. The sensitive LSC detection method requires specific cocktails to absorb the energy into detectable light pulses. In order to efficiently transfer the emitted energy into light, LSC cocktails must consist of two basic components:

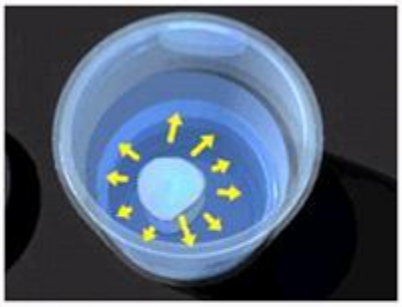
- The aromatic, organic solvent
- The scintillator(s) or fluors

As the majority of samples applied in LSC are aqueous-based, most of the LSC cocktails consist of:

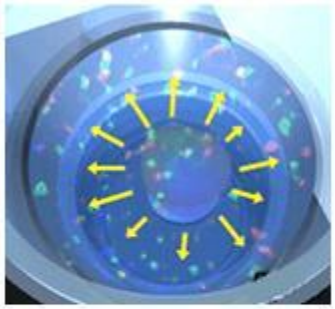
- The aromatic, organic solvent
- The scintillator(s) or fluors
- The surfactants

Principle of LSC

After excitation of the aromatic solvent molecules through the energy released from a radioactive decay, the energy is next transferred to the scintillator (also sometimes referred to as the "phosphor" or "fluor"). The energy absorbed through the scintillators produces excited states of the electrons, which decay to the ground state and produce a light pulse characteristic for the scintillator. The light is detected by the photomultiplier tube (PMT) of the liquid scintillation counter.



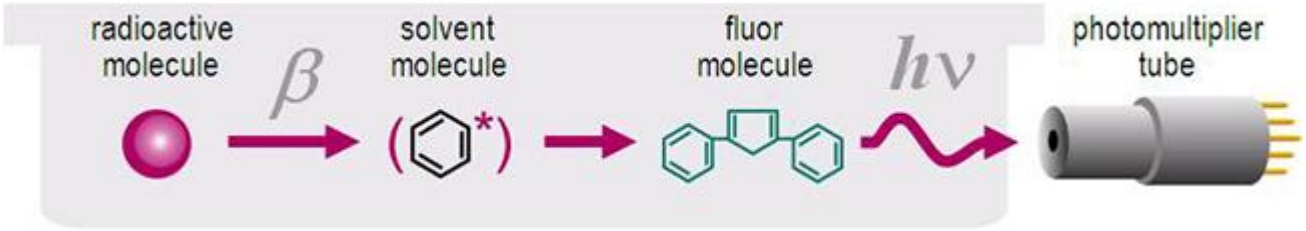
Beta particles are emitted, which cause solvent molecules to become excited



The energy of the solvent molecules is transferred to the fluor molecules, which in turn emit light

LSC counting principle

Below is a schematic overview of the scintillation process.



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