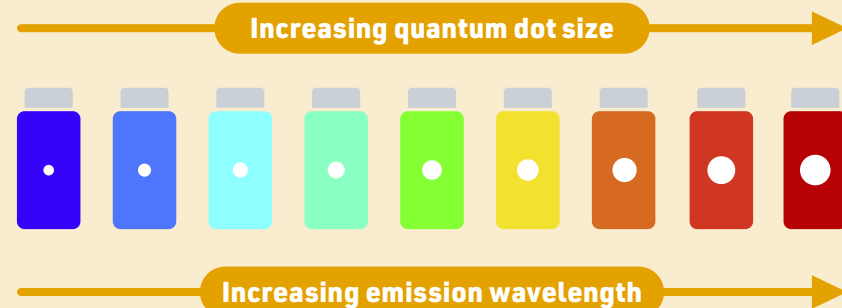


The 2023 Nobel Prize in Chemistry



The 2023 Nobel Prize in Chemistry was awarded jointly to **Moungi G. Bawendi**, **Louis E. Brus** and **Alexei I. Ekimov** for the discovery and synthesis of quantum dots.

Quantum dots are nanoparticles of semiconducting materials. Their very small size gives them properties that differ from those of larger particles of the same material. For example, their absorption and emission of light varies with size. This is due to quantum effects arising from electrons in the particles being squeezed together.



Smaller particles

Blue



Larger particles

Yellow



Smaller particles

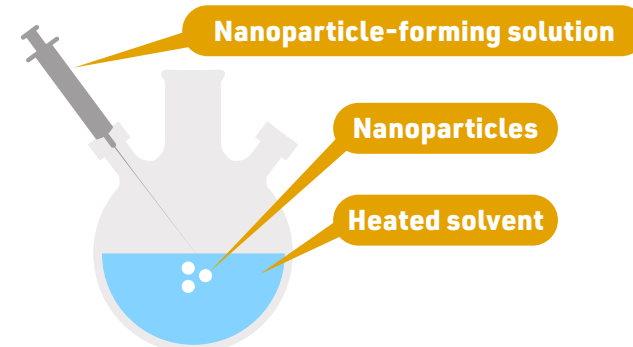
Yellow

CdS



Larger particles

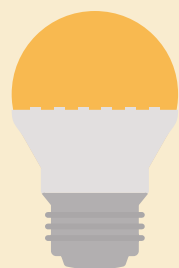
Red



In 1981, **Alexei Ekimov** made glass tinted with copper chloride. He noticed that the size of the copper chloride nanoparticles that formed in the glass affected the glass colour. This was the first time someone deliberately produced quantum dots.

In 1983, **Louis Brus** created solutions of cadmium sulfide nanoparticles, and noticed that the properties of freshly made and older solutions differed. He also discovered that the smaller the nanoparticles, the bluer the light they absorbed and emitted.

In 1993, **Moungi Bawendi** grew nanocrystals of cadmium selenide of a specific size in a solvent which produced smooth and even particles. This effective method for producing quantum dots paved the way for their use in wider applications.



WHY DOES THIS RESEARCH MATTER?

QLED televisions use quantum dots to enhance the colours displayed on screen. They are also used in some LED lamps. Future applications could include flexible electronics, tiny sensors, and thinner solar cells.

Nobel Prize in Chemistry press release: <https://www.nobelprize.org/prizes/chemistry/2023/press-release/>