



PEROVSKITES

Making radioactivity measurement
more accessible



NUCLEAR MEASUREMENT

KEP Technologies is a full solution provider. With **SETS SAFE** we offer standard and customized nuclear measurement solutions. We manage entire projects from the feasibility study up until installation, training and maintenance, as required.

We are confident that with KEP Technologies, you will find measurement solutions with the performance needed to characterize and efficiently manage your nuclear materials. This being the case no matter which of our below market segments you may work in.

DEFENSE

Safeguard, accounting, inventories - Detection of radioactive sources - Control of tritium or special nuclear materials content - Storage.

INDUSTRY

Detection of radioactive sources - Safeguard, accounting, inventories - Enrichment - Waste characterization - Automated storage.

WASTE & DISMANTLING

Characterization of waste or materials for safety, selection of storage method, recovery of legacy waste, transport of materials - Radiological inspection before dismantling - Thermal management

RESEARCH

Thermal stability and properties, development of materials for detection, and characterization of waste for the dismantling of research reactors.



THE KEP TECHNOLOGIES ADVANTAGE

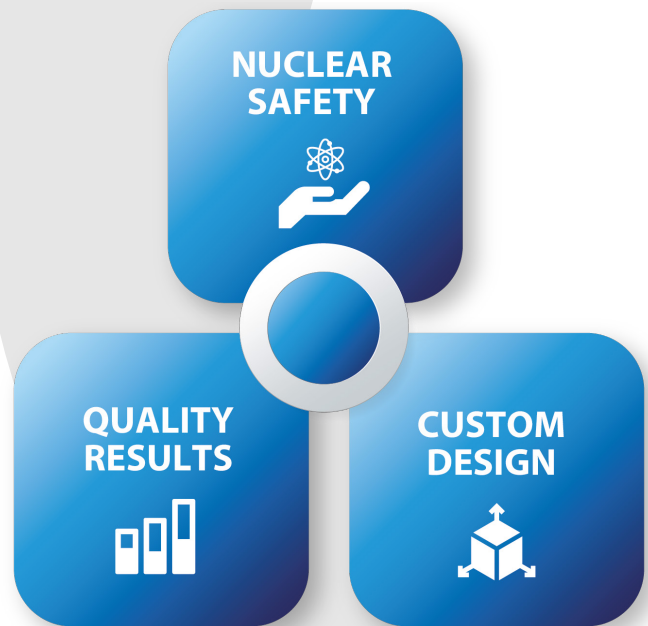
Despite operating in demanding contexts, each of our Setsafe solution incorporates three essential elements to ensure the best nuclear measurement :

QUALITY RESULTS thanks to the application of our proprietary technologies or the integration of the most reliable technologies on the market.

NUCLEAR SAFETY, taking into consideration your constraints: radiological environment (integration in glovebox or hot cell), data protection, seismic resistance.

CUSTOM DESIGN, with solutions tailored to your specific needs in terms of measurement, automated or manual handling etc.

We know that solutions providing these benefits deliver the highest value to our customers.



OUR SOLUTIONS

PEROVSKITES represent a wide range of materials. The halide perovskites developed under the SETSAFE brand are the result of developments by KEP Technologies and research carried out by Prof. Forró's group at the École Polytechnique Fédérale de Lausanne. There is growing interest in their use in the detection of ionizing radiation.

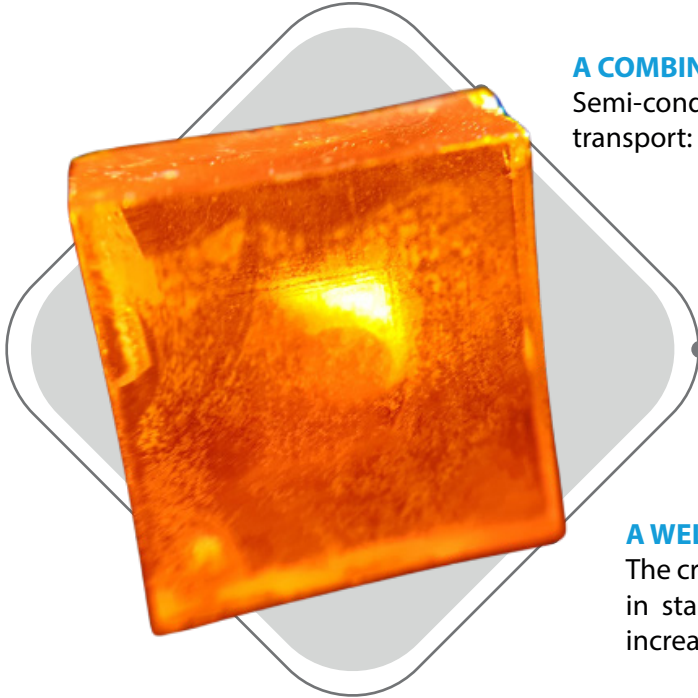
KEP Technologies uses halide perovskite crystals in the development of **detection and alarm devices**. Depending on their design and performance, these devices cover applications such as the detection of radioactive sources, in the context of **defence or public protection** against nuclear and radiological risks. Developments focusing on these crystals are also paving the way for industrial nuclear safety and medical applications.

Our expertise in synthesizing these crystals means that we can now make them available to our customers for their own research and development.



PEROVSKITES

MAKING RADIOACTIVITY MEASUREMENT MORE ACCESSIBLE



A COMBINATION OF KEY PROPERTIES

Semi-conductivity, high radiation absorption, efficient charge transport: the ideal combo for detector development.

IDEAL FOR ELECTRODE INTEGRATION

Their shape and synthesis process allow great flexibility in the design and addition of electrode assemblies.

A WELL-CONTROLLED PRODUCTION PROCESS

The crystals are synthesized in our laboratory in Switzerland, in standard or custom sizes. They can be encapsulated to increase their shelf life.

	MA	CS	BENEFITS
Composition	Methylamonium lead bromide single-cristal (MAPbBr ₃)	Cesium lead bromide single-cristal (CsPbBr ₃)	Single phase
A x B x C* in mm	10 x 10 x 4 5 x 5 x 2	6 x 6 x 2 3 x 3 x 1	Rectangular prism
Dimensions variations* (mm)	+/- 1	+/- 1	
Band gap (eV)	2.2	2.3	Large absorption band
Linear attenuation coefficient at 600keV (1/cm)	0.09	0.09	High gamma rays absorption capacity

* Standard or custom dimensions.

RADIOACTIVITY MEASUREMENT

PROPERTIES

Halogenated perovskites have a high density and absorb radiation efficiently, which is essential for detection. Their mean resistivity and charge transport capacity are enhanced by the possibility of developing highly advanced electrode architectures.

They are also highly resistant to radiation.

SYNTHESIS

The **processes for manufacturing** halogenated perovskites by **inverse temperature crystallization** are all carried out in solution, at low temperature, without the need for complex infrastructures. They are therefore **robust** and **economical**. KEP Technologies also masters the techniques of electrode deposition and the inclusion of foreign bodies in these crystals.

FUNCTIONS

The combination of their properties, particularly absorption and electrical resistivity, makes them ideal for designing **high-sensitivity detectors** with a low detection limit.

Their resistance to radiation means they have **longer shelf life**, even under high flux conditions.

Paving the way for devices offering high energy resolution, they are prized for applications in **spectrometry**, including isotopic identification of sources.

COMPETITIVE

The combination of exceptional properties and well-controlled synthesis make KEP's halide perovskite crystals a serious challenger to conventional semiconductor materials such as CZT.



Switzerland - France - China - United States - India - Hong Kong
For contact details : www.setsafesolutions.com or setsafe@kep-technologies.com

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