



- Thermoelectrically cooled sensors are intended for the determination of element composition of soil on the Solar system planets.
- $Si(Li)$ detector is used as an X-ray-gamma sensor.
- To provide high sensitivity and resolution of the sensor, thermoelectric cooling down to the temperature of minus 100°C is used.
- Thermoelectrically cooled sensors provide energy resolution of order 600 eV for the energy of 5.9KeV, allowing to determine element concentration in the soil up to 10^{-6} .
- To measure the energy resolution of thermoelectrically cooled sensors, the Fe^{55} and Co^{57} isotopes have been used.

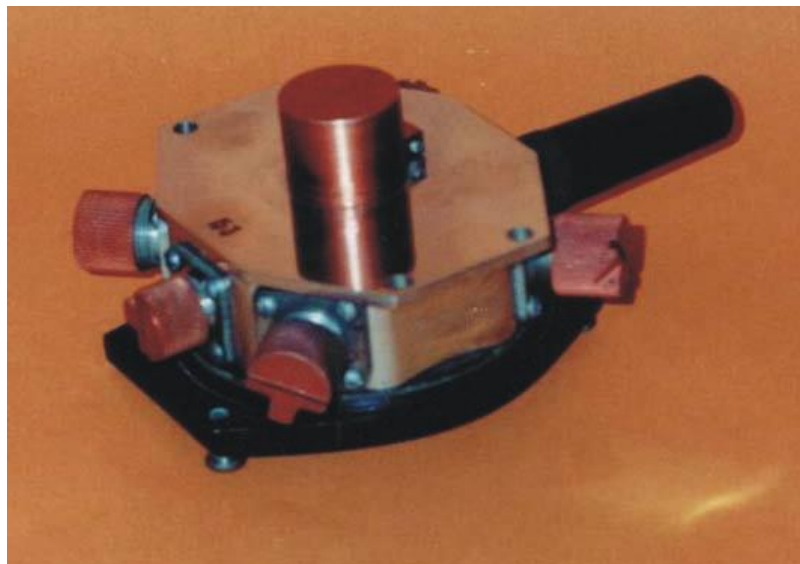


Fig.1. Thermoelectrically cooled sensor for the determination of element composition of soil.

Technical features

N	Parameter	Designation	Measuring unit	Value	Remark
1.	Energy resolution, not worse	η	eV	600	For energy of 5.9 keV
2.	Isolation resistance between disconnected electrical circuits, not over	R	MOhm	20	At relative humidity of 80%
3.	Power requirement in the supply circuit of thermoelectric cooler	W	W	40	
4.	Time of achieving the mode, not more	t	min	10	
5.	Supply voltage of thermoelectric cooler	U	V	12±5	
6.	Pressure inside thermoelectrically cooled sensor, not over	P	mm Hg	5·10 ⁻³	In operating state
7.	Cooling at ambient temperature of 0°C, not over	T _c	°C	minus 100	
8.	Weight, not over	m	g	1500	
9.	Service life at continuous operating mode, not over	t _p	hours	2	
10.	Service life at periodic operating mode, not less	t _R	hours	30	
11.	Possibility of failure-free performance, not less	γ	%	99.9	
12.	Time of depressurization of thermoelectric sensor, not less	t	min	5	

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