THE AMPLIFICATION OF FORCE OF THE CURRENT ON BASIS IN Ag_2S

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ABSTRACT

The electrical and thermoelectrical properties of Ag_2S have been investigated in the temperature interval 430÷440K. Apparently I(T) at ~435K by jump it is increased approximately by 4 order, and U(T) decreases on 5 order. Presence phase transition (PT) in Ag_2S allows use it in measuring engineering for amplification of weak electric signals. Thus, the offered device enables both amplification of small currents and it of small voltage.

Keywords: thermoelectrical, phase transition, Peltier effect, electroconductivity, thermoelement.

I. INTRODUCTION

In [1] it is shown, that use of effect Peltier for management of structural phase transition (PT) allows to create a lot of devices, for all these devices a starting position is that is possible to operate them with the help of effect Peltier. Search is necessary for this purpose should materials, which they undergoing structural PT.

II.MAIN TEXT

Practical application of electron-ionic conductors in such devices of processing of the information and sources of a current does now actual research of sulfide of silver Ag_2S.Ag_2S in an interval of temperatures 430÷440K passes from low temperature α phases in high-temperature β a phase [2]. Physical properties in Ag_2S depend on a degree of a deviation from stoichiometry, i.e., as against Ag_2Te and Ag_2Se, in sulfide of silver surplus of sulfur results in increase of electroconductivity, and surplus of silver - to its reduction. Temperature of PT also depends on the contents of silver and sulfur; Surplus of sulfur shifts temperature of transition in high-temperature region [3].

Fig.1 shows temperature dependences of force of current I (T) and voltage U (T) forming on contacts of the sample, allowing to measure electro conductivity. Apparently I (T) at ~435K by jump it is increased approximately by 4 order, and U(T) decreases on 5 order. It enables to create the device for amplification of weak electric signals.

Apparently from fig.1 at phase transition in Ag_2S resistance falls jump (R~U). Presence PT in Ag_2S allows to use it in measuring engineering for amplification of weak electric signals.

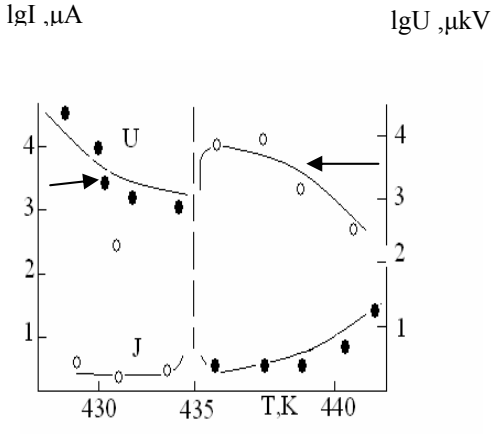
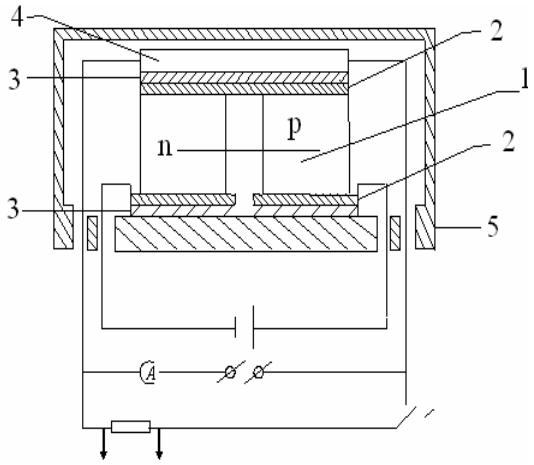


Fig.1 Temperature dependence of force of a current and voltage.

The fig.2 shows the circuit of the offered device is submitted. Devices consists of thermoelement Peltier, (which p-branch is made from Bi-Te-Sb, the n-branch from Bi-Te-Se) (1) sizes 5x5x5 мм^3, on a working layer (2) which in thermal contact to it is Ag_2S+0,25ат. % Ag as a thin plate (3) with the sizes 6x3x0,25мм^3 (having PT at



Fg.2 The devise for amplification the force of a current.

426K and in which at PT resistance falls on 5 orders), attached through electroisolated thermaltransition (4) to element Peltier.

The amplifier works as follows: in thermostat (5) it is establishe the temperature, approximately on 1K lower temperatures PT of a material thermaltransformator (3). Then raises temperatures electroisolated thermaltransition (4) on 1K, that results in realization PT which is accompanied by reduction of resistance by ~5 orders. Such sharp reduction of resistance results in increase of a current through the device on ~4,5 order. At submission of signal U_{bx} in a thermoelement (1) capacity $W=IU_{bx}$ which results in allocation heat Q=EW, where $E = \frac{T}{\Delta T} f(z)$ - refrigerating factor, f(z) function of criterion Ioffe, ΔT - a difference of temperatures, on which neate thermaltransformator for realization PT is allocated. On 1K in area PT (T=425K) it is enough for change of temperature of the device I_{ex}=40mA. At transition from lowtemperature α-phases in high-temperature β α phase (α→β) the current amplifies, and at transition β→α voltage. For this purpose it is enough to change directions of entrance current I_{ex} in a circuit of thermoelements Peltier.

III. CONCLUSION

Thus, the offered device enables both amplification of small currents, and amplification of small voltage.

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