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**Abstract** – A novel thermal-retaining phase-transition based composite material for air regeneration devices was developed. A combination of physical-chemical analytical methods was used for studying its thermo-physical characteristics, i.e. temperature of phase transition, heat capacity, thermal conductivity, etc. A composition of the gas phase was investigated in the process of heating the material up to 150°C. It was revealed that the material could withstand the targeted operating temperatures of respiratory protective equipment and allow to reduce significantly the temperature of inhaled air at the level not higher than 45°C.

*Keywords:* heat-retaining material; paraffin; phase change, respiratory protective equipment.