

**SOLAR HEAT COLLECTION ADSORPTION COMPOSITE TUBE, SOLAR
HEAT COLLECTION ADSORPTION COMPOSITE BED COMPOSED OF
SOLAR HEAT COLLECTION ADSORPTION COMPOSITE TUBES, AND
COOLING AND HEATING SYSTEM FORMED OF SOLAR HEAT
COLLECTION ADSORPTION COMPOSITE BED**

ABSTRACT

A solar heat collection adsorption composite tube (1.2), and a cooling and heating system having a solar heat collection adsorption composite bed (1) composed of solar heat collection adsorption composite tubes (1.2), the solar heat collection adsorption composite bed (1) comprising a lower connecting box (1.1), an upper connecting box (1.3) and several solar heat collection adsorption composite tubes (1.2) connected to the lower connecting box (1.1) and the upper connecting box (1.3). Each solar heat collection adsorption composite tube (1.2) comprises a solar vacuum tube (1.2.1) having two end openings, an outer layer metal tube (1.2.2) and an inner layer metal tube (1.2.3) are sequentially and coaxially provided within the solar vacuum tube (1.2.1), a solid adsorbent (1.2.4) is provided between the outer layer metal tube (1.2.2) and the inner layer metal tube (1.2.3), and a plurality of through-holes are provided on the inner layer metal tube (1.2.3) for an adsorbate to pass through. The lower connecting box (1.1) and the upper connecting box (1.3) are both formed of an outer casing and an inner sleeve. The cooling and heating system comprises one or more solar heat collection adsorption composite beds (1) composed of the solar heat collection adsorption composite tubes (1.2) and arranged in parallel, an adsorbate circulation sub-system, a water circulation sub-system, pipes connected to the various systems and devices, and pumps (2.1-2.6) and valves (10.1-10.10, 11.1-11.2) provided on the pipes.

Fig. 3