

Temperature phenomena in influence on sodium chloride ultrashort laser pulses: Hydrodynamic effects

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The thermomechanical ablation of NaCl by 40 fs laser pulses was examined in [1]. The peculiarity of the influence fs laser pulses on solid materials, with surface density of energy $\simeq 1 \text{ J/sm}^2$, consist in what, that main temperature process go after the end laser pulse, when in consequence ultrafast phase transitions, according to our calculation, elapse the heating of NaCl to temperature $T_k \simeq 3 \text{ kK}$ [2], which considerable greater boiling-point $T_b = 1738 \text{ K}$ [3]. Hydrodynamic phenomena in influence fs laser pulses on Ag and Au was studied in [4]. It was noted, that in this materials the crater dimension 100 nm has formed with register of the appearance chopping dome, which has begun to separate after the start of nucleation steam embryos into melt metal. This effects must take place for experiments [1] too, as $T_k \gg T_b$, and specific heat evaporation NaCl (4.0 kJ/kg [3]) considerable less this parameter for Ag and Au (2.35 and 1.65 MJ/kg). The melt of NaCl arise after end laser pulse, and crater dimension order of magnitude $1 \mu\text{m}$ has formed [1]. If take into consideration difference of coefficients of heart conduction—7 W/(m K) for NaCl [3], 419 W/(m K) for Ag and 313 W/(m K) for Au—become more clearly fact, that the depth of crater for NaCl on order greater, than the depth for Ag and Au.

- [1] Gavasheli Y O *et al* 2016 *Dokl. Phys.* **61** 577–578
- [2] Savintsev A P and Gavasheli Y O 2013 *Dokl. Phys.* **58** 411–412
- [3] Vorobyov A A 1968 *Mechanical and Thermal Properties of Alkali Halide Single Crystals* (Moscow: Vysshaya Shkola)
- [4] Inogamov N A *et al* 2008 Hydrodynamic of interaction ultrashort laser pulse with matter: Comparison calculation and experiment *Physics of Extreme States of Matter—2008* (Chernogolovka: IPCP RAS) pp 172–175