$$1-n_1 = const'' \times \left[1 - e^{-\frac{A}{\sqrt{2eB}})}\right].$$

The dependence of MMP on the replicon rate ν has the form

$$1-n_1 = const'' \times e^{-\frac{A}{\sqrt{4e\gamma\chi}}\frac{1}{\upsilon}}$$

The mutation probability increases evenly from 0 to ½ with temperature increasing. This is explicable result as at high temperatures the depth difference of potential wells vanishes.

The factor of SHF influence on the process of point mutation formation in DNA is heat liberation. The temperature increasing in unit volume in dielectric is defined by the following formula

$$\Delta T = \frac{dT}{dt} \times t = 8 \times 10^{-12} E^2 f \frac{\varepsilon''}{\gamma C} \times t.$$

Here E is the electromagnetic field strength, f is the characterized frequency of electromagnetic field, g is the material density, C is the specific heat, ε'' is the imagine part of medium dielectric constant, $\Delta T = T - T_0$ (T_0 is the SNA temperature before irradiation). At other types of irradiation (neutrons, ion beam) ΔT is calculated by thermal spike formulas (θ-spike).

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STRUCTURAL FORMATION OF ALUMINIDE PHASES ON TITANIUM ALLOY DURING ANNEALING

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The aluminum layer on the surface of titanium alloy has been formed by thermal deposition. The structural formation of aluminide phases on the surface has been studied. The sequence of structural transformations at the Ti/Al interface is limited by the reaction temperature and time. The sequence of aluminide phase formation is occurred in compliance with Ti-Al equilibrium phase diagram. At the initial stages at the Ti/Al interface the Al3Ti alloy starts forming as a result of interdiffusion, and gradually the whole aluminum films is spent on the formation of this layer. The Al3Ti layer decomposes with the increase of temperature (>600C). At 800C the two-phase (Ti3Al+TiAl) layer is formed on the titanium surface. The TiAl

compound is unstable and later on with the increase of the exposure time at 800C gradually transforms into the Ti3Al. The chain of these successive transformations leads to the formation of the continuous homogeneous layer consisting of the Ti3Al compound on the surface. At temperatures exceeding the allotropic transformation temperature (>900C) the Ti3Al compound starts decomposing. All structural changes taking place at the Ti/Al interface are accompanied by considerable changes in micro hardness. The structure of initial substrate influences on kinetics of phase transformation and microstructure development.

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POSSIBILITY OF METAL- INSULATOR TRANSITIONS IN HOLE-DOPED CUPRATES INDUCED BY STRONG ELECTRON CORRELATION, DISORDER AND EXTRINSIC CARRIER SELF- TRAPPING

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After the discovery of the doped high-Tc cuprate superconductors, it is recognized that their superconducting (SC) properties are closely related to the metal-insulator transitions (MITs). Therefore the MITs in the hole-doped cuprates would be the important clue to elucidate the mechanism underlying high-Tc superconductivity. The strong electron correlation and disorder can cause carrier localization and produce the MITs in doped systems, which are called the Mott and Anderson transitions [1]. The questions concerning the applicability of these two basic mechanisms for MITs to doped high-T_c cuprates are still not settled [2-4]. The MITs may be also caused by the strong carrier-phonon-defect interactions which become dominating in polar systems including high-T_c cuprates. Here, we study the possibility of the Mott and Anderson MITs driven by the strong electron correlation (in a narrow impurity band) and disorder (in the special distribution of dopants) and the new MITs caused by the strong dopant (impurity)-carrier-phonon interactions. By considering the correlation and screening effects of two carriers in the same hydrogen-like impurity center, the formation of the different superlattices of dopants and the effect of randomness in the dopant distribution, we obtain the adequate criteria for the Mott and Anderson transitions and discuss the validity of the criteria for the MITs in hole-doped cuprates. The new criteria for the Anderson MIT are derived taking into account the polaronic effects in these materials. We also derived the quantitative criteria for the new MITs driven by the strong dopant-carrier- phonon interactions which lead to the extrinsic self-trapping of carriers and the formation of large polarons and bipolarons. It is shown that the criteria for the Mott MIT are not well satisfied in hole-doped cuprates. While the newly derived criteria for the Anderson MIT and the new MITs are more applicable to these polar materials. Our results are in quantitative agreement with existing well-established experimental data and shed important light on the different mechanisms of the MITs that occur in doped polar systems, such as high-Tc oxides and related materials.

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References:

1. N.F. Mott, Metal-Insulator Transitions, Taylor & Francis, London, 1990.