

Физика вещества с высокой концентрацией энергии
Научно-координационная Сессия "Исследования неидеальной плазмы"
30 ноября - 1 декабря 2009 г., ПРЕЗИДИУМ РАН, Ленинский пр-т 32а, Москва

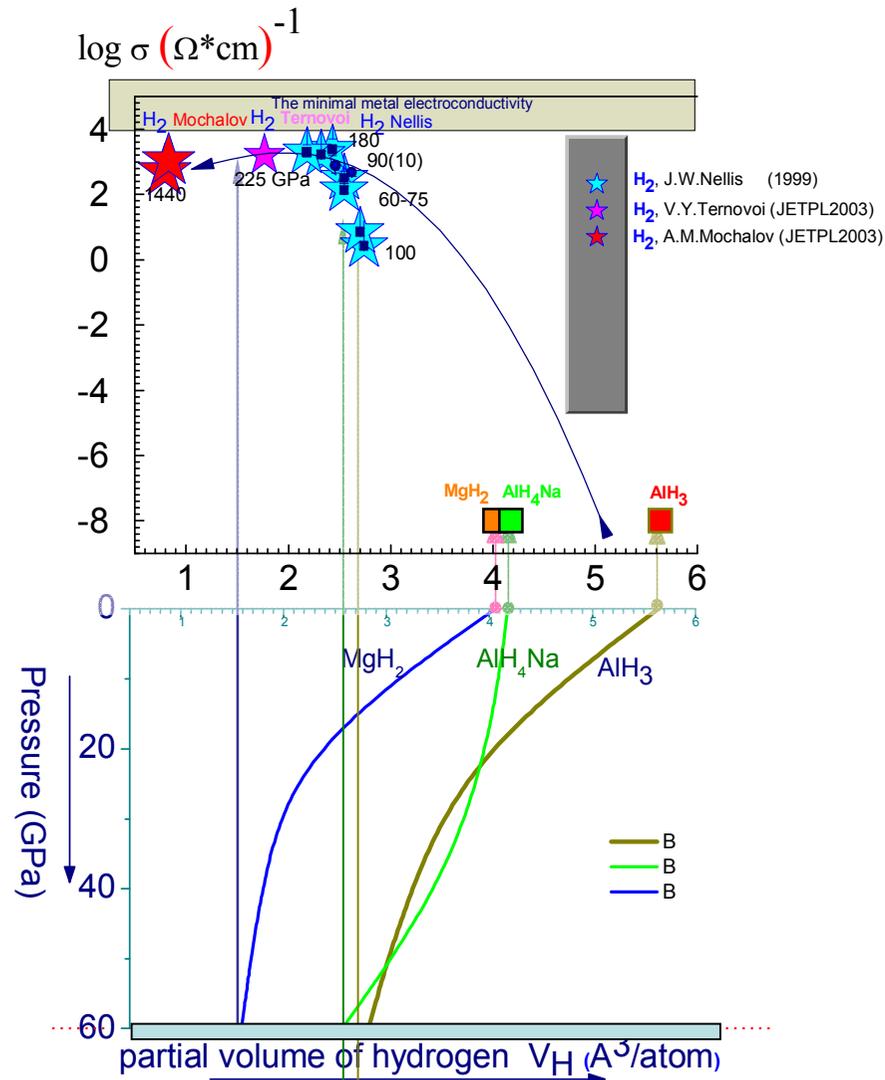
ЭЛЕКТРОПРОВОДНОСТЬ ГИДРИДОВ ЛЁГКИХ МЕТАЛЛОВ ПРИ СИЛЬНОМ УДАРНОМ СЖАТИИ

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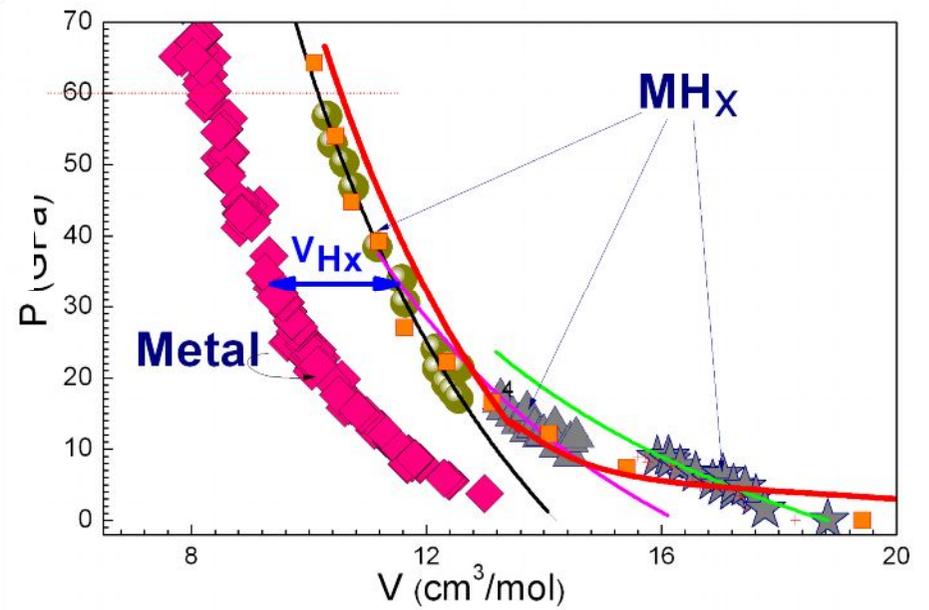
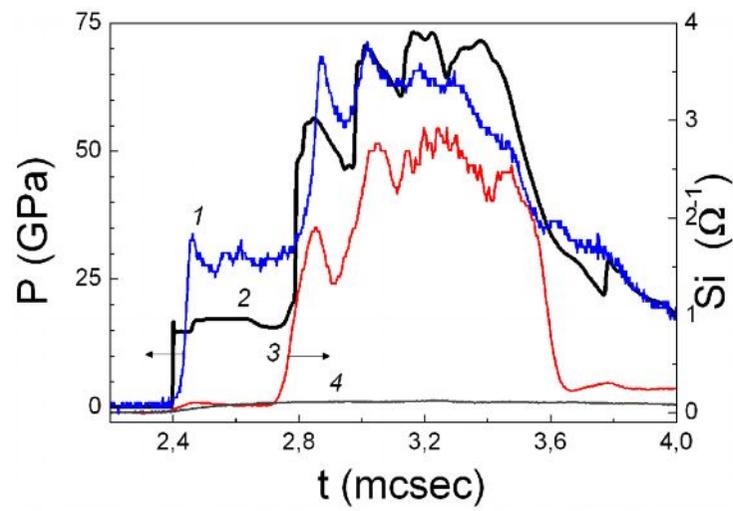
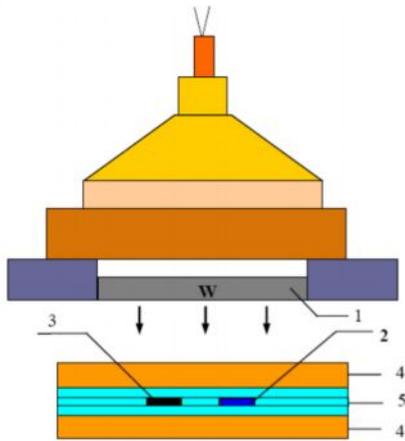
Москва-2009

ВВЕДЕНИЕ И ПОСТАНОВКА ЗАДАЧИ

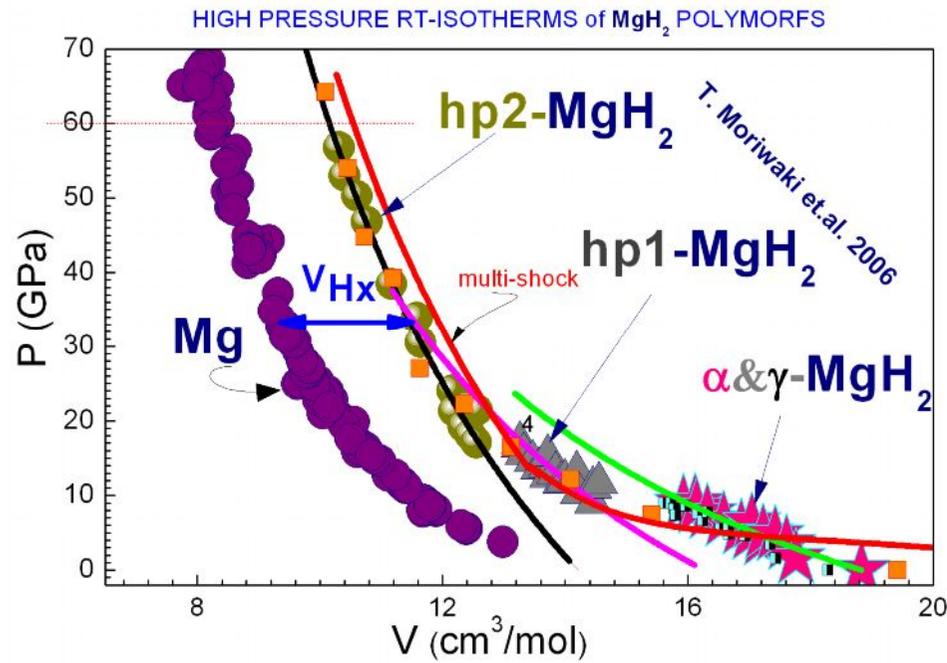


Исследуемые гидриды: [ковалентный AlH_3], [промежуточный MgH_2], [ионный LiH], [аланат натрия AlH_4Na]

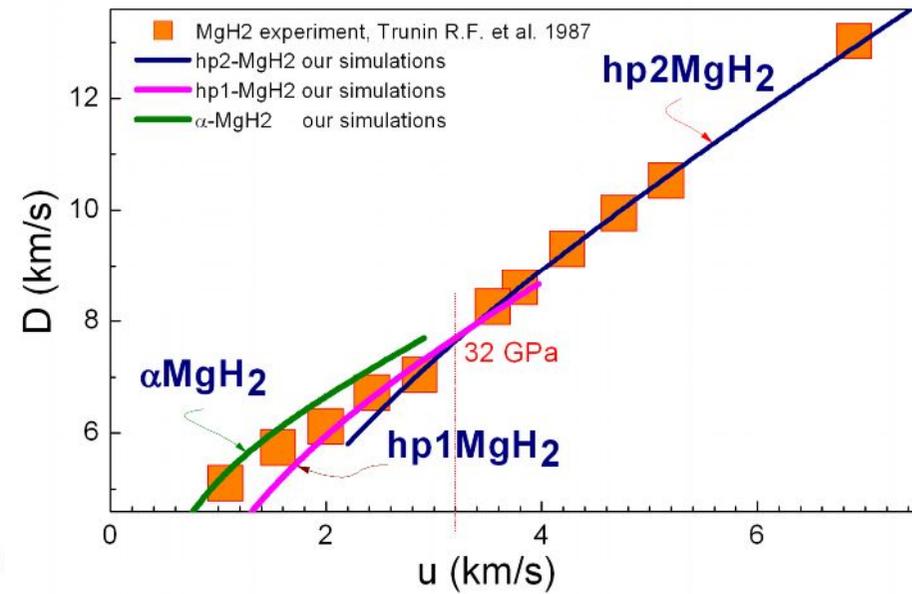
ЭКСПЕРИМЕНТ



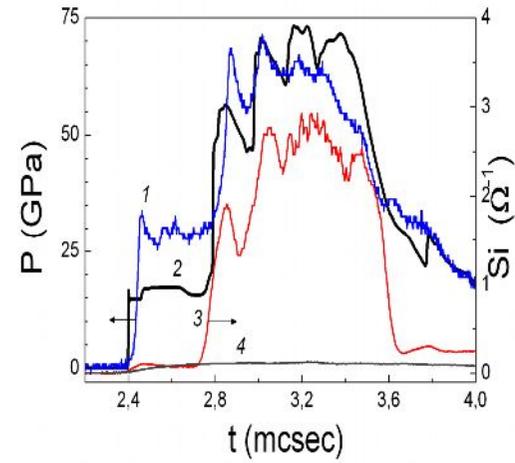
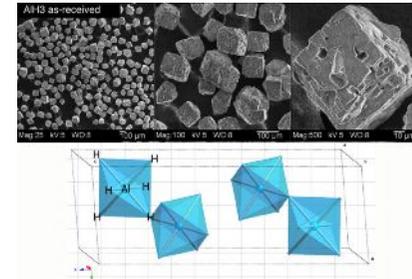
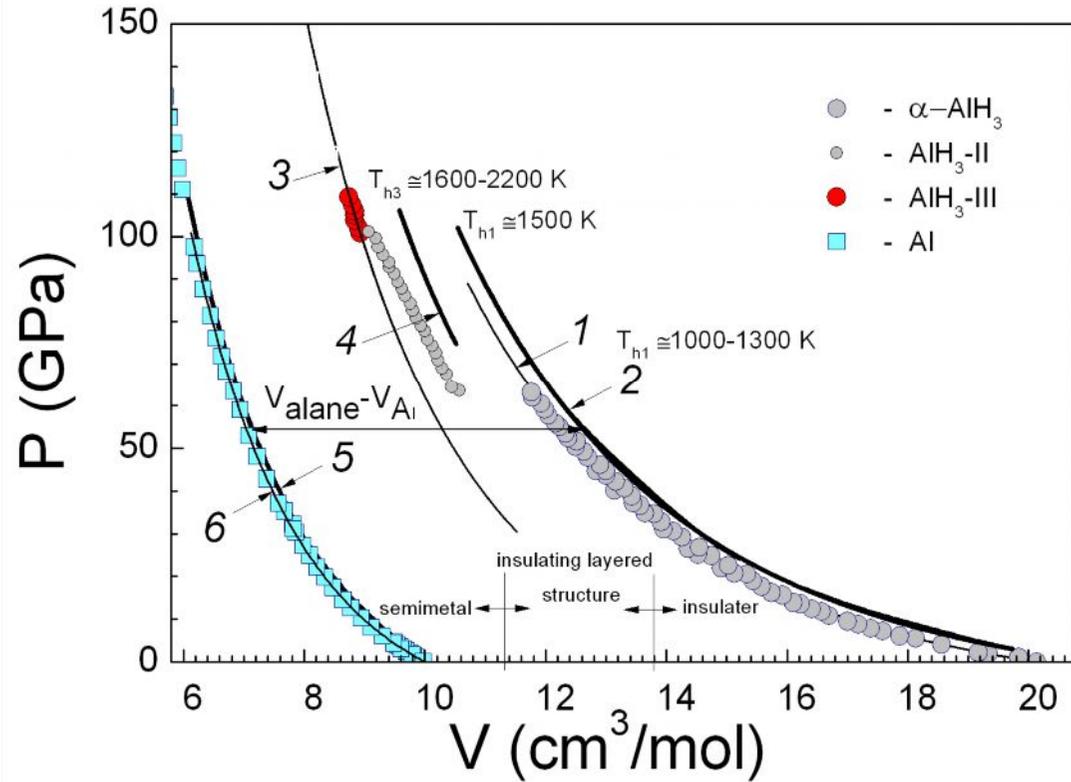
МОДЕЛИРОВАНИЕ УДАРНОГО СЖАТИЯ ГИДРИДОВ С УЧЁТОМ ИХ ФАЗОВЫХ ПРЕВРАЩЕНИЙ В УДАРНЫХ ВОЛНАХ



HUGONIOT OF SINGLE and MULTI-SHOCK COMPRESSION of MgH_2 POLYMORFS

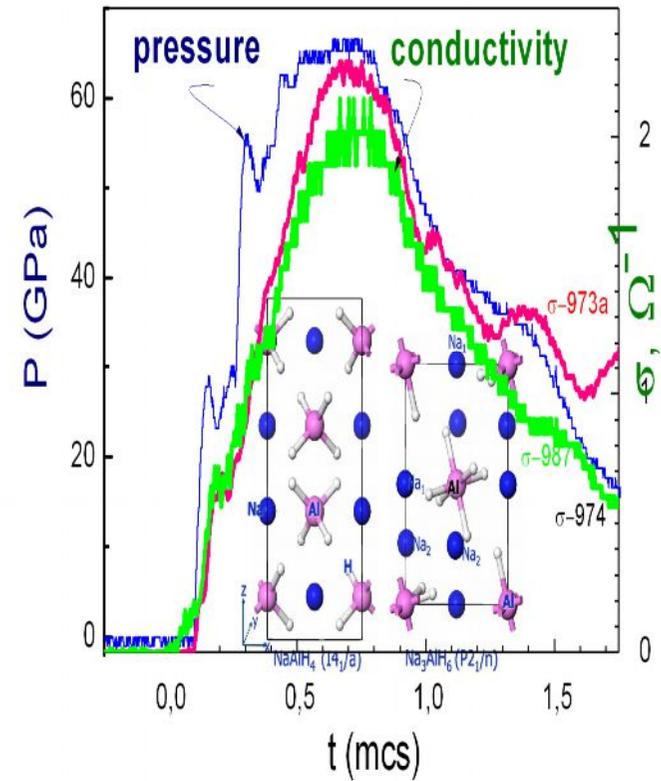
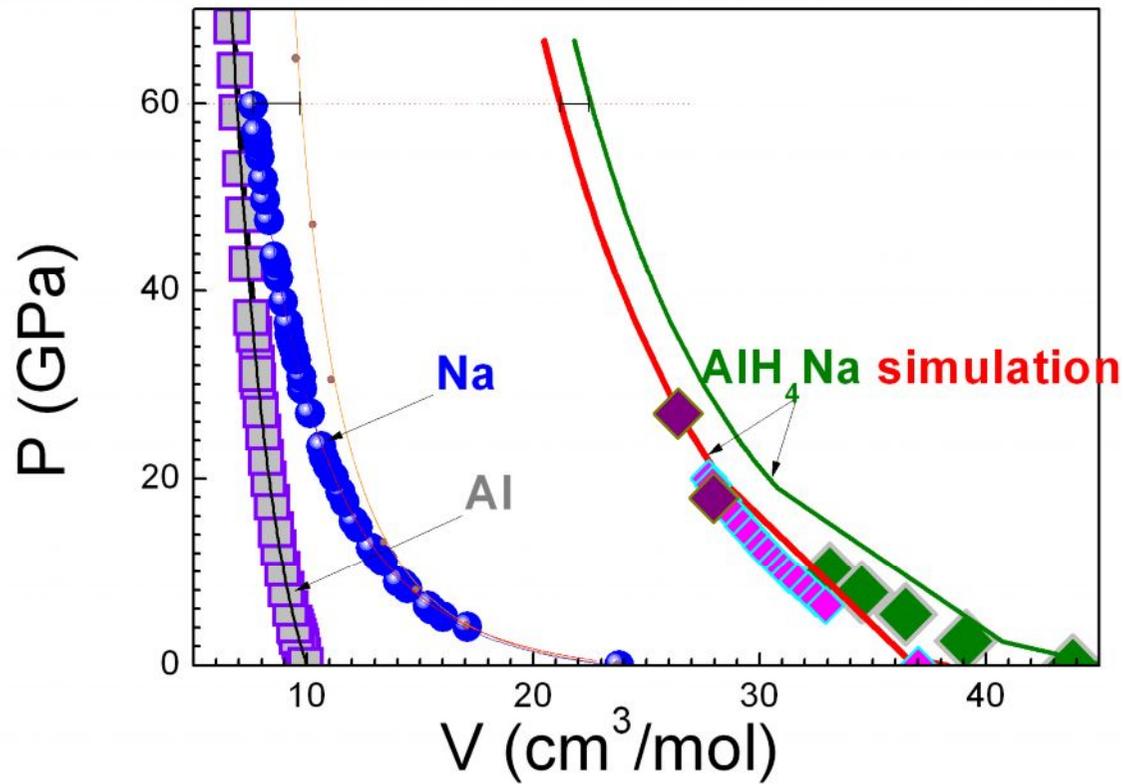


ЭЛЕКТРОПРОВОДНОСТЬ АЛАНА (AlH_3)

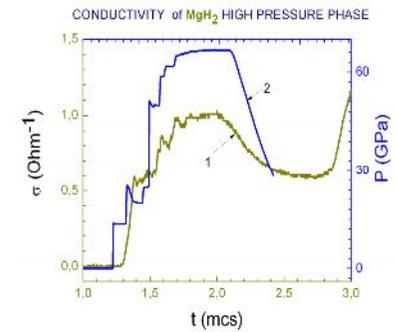
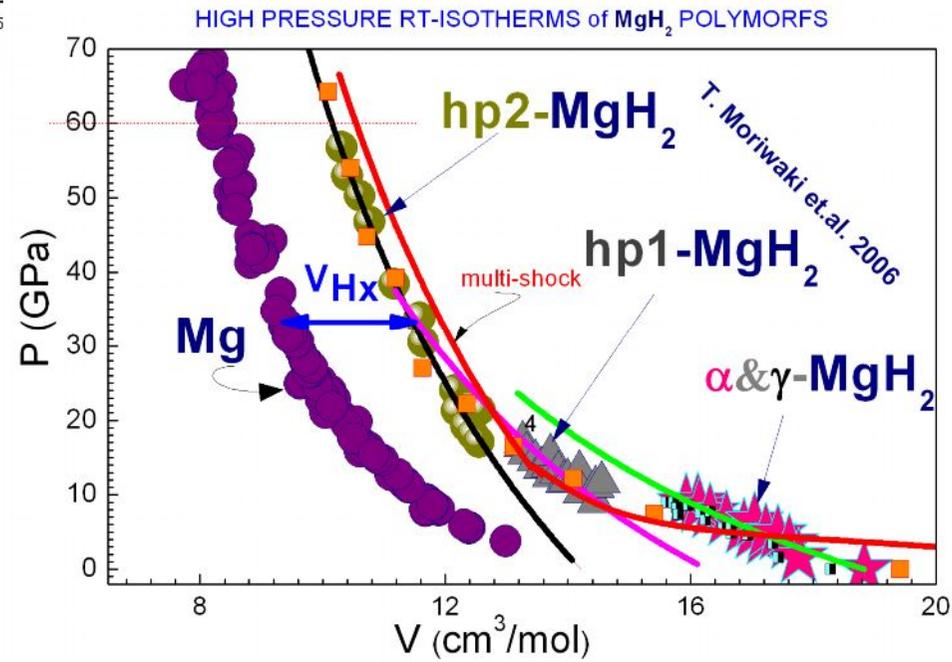
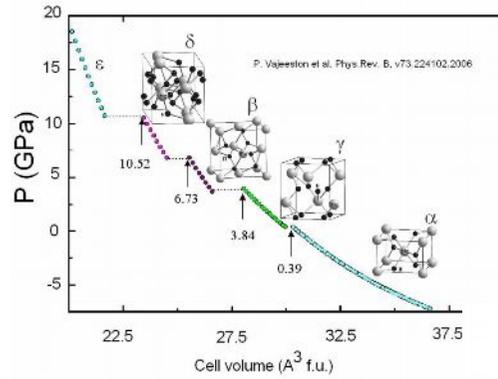


ЭЛЕКТРОПРОВОДНОСТЬ АЛАНАТА НАТРИЯ

CONDUCTIVITY of AlH_4Na SAMPLE AT MULTI-SHOCK COMPRESSION

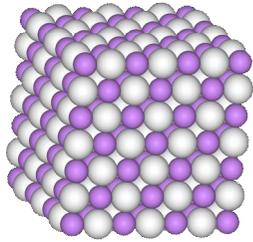


ЭЛЕКТРОПРОВОДНОСТЬ ОБРАЗЦОВ ГИДРИДА МАГНИЯ (MgH_2)

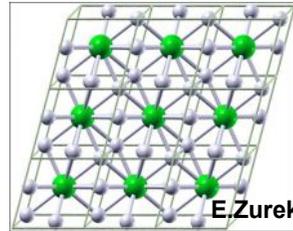


ОСОБЕННОСТЬ УДАРНОЙ АДИАБАТЫ И ЭЛЕКТРОПРОВОДНОСТИ УДАРНО-СЖИМАЕМОГО ГИДРИДА ЛИТИЯ (LiH)

LiH

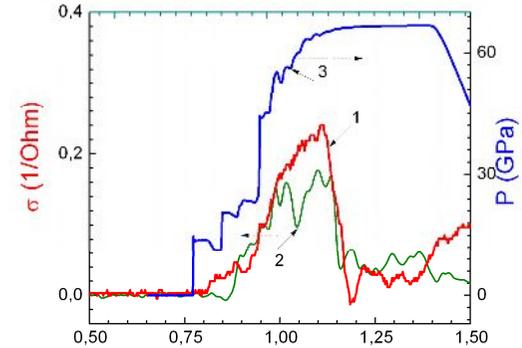


LiH₆

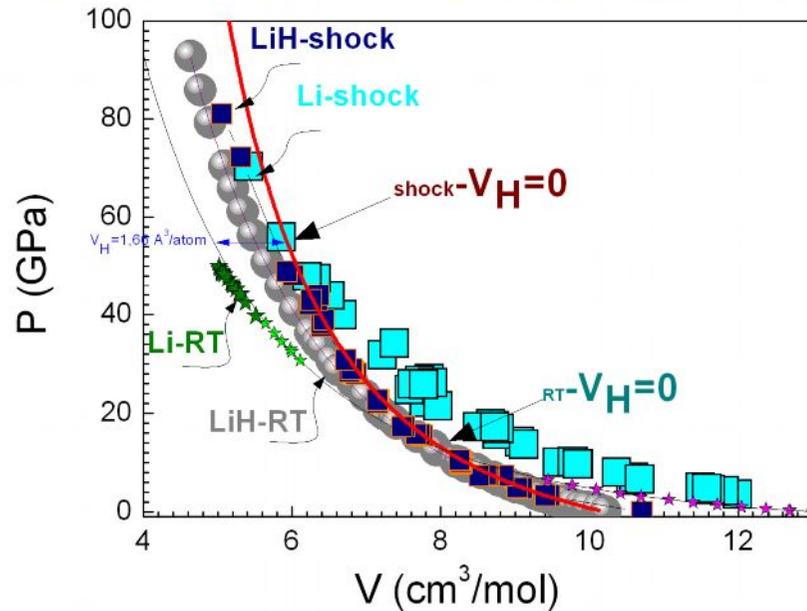


E.Zurek et al. 2009

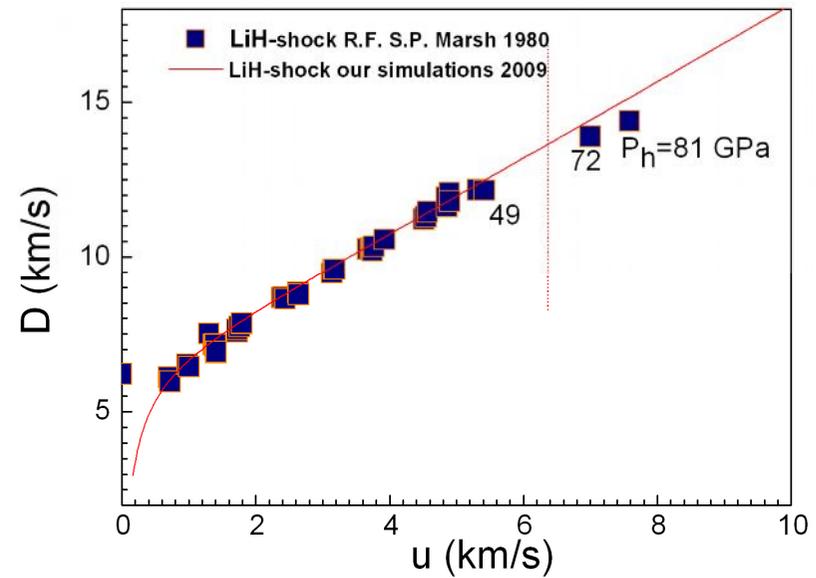
CONDUCTIVITY of LiH at MULTI-SHOCK COMPRESSION



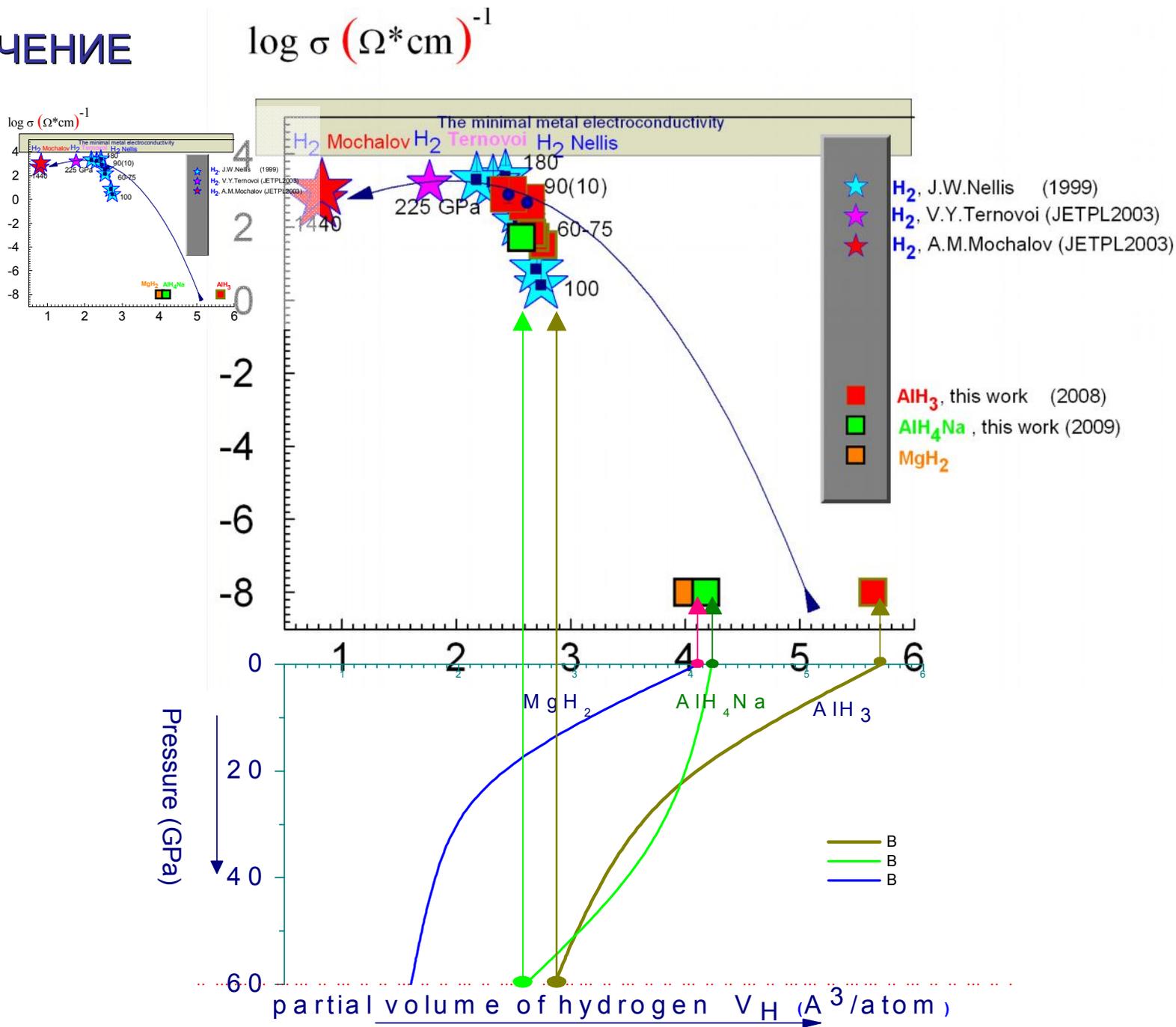
ISOTHERMAL, shock and multi-shock COMPRESSION of LiH and L



SINGLE SHOCK COMPRESSION of LiH and its SIMULATIONS

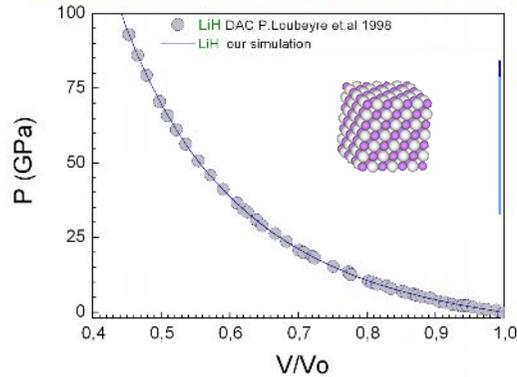


ЗАКЛЮЧЕНИЕ



СВОБОДНАЯ ЭНЕРГИЯ $F=F(V,T)$ ПОЛИМОРФНЫХ МОДИФИКАЦИЙ ГИДРИДОВ (ПОЛУЭМПИРИЧЕСКОЕ ПРИБЛИЖЕНИЕ)

ISOTHERMAL COMPRESSION of LiH and its SIMULATIONS



$$F = E_x + 3R \left[\frac{\Theta}{2} + T \ln \left(1 - \exp \left(-\frac{\Theta}{T} \right) \right) \right] - a_S RT. \quad (1)$$

In Eq. (1) all designations are traditional, but the kind of key functions - characteristic Einstein temperature Θ and potential energy E_x are defined by new formulas [8]. According to [8] the expression for characteristic temperature $\Theta = \Theta(V)$, depending only from volume V , is defined as

$$\Theta = \Theta_0 \left(\frac{v_0 - V}{v_0 - V_0} \right)^2 \left(\frac{V_0}{V} \right)^{\frac{2}{3}}, \quad (2)$$

where $\Theta_0 = \Theta(V_0)$. The parameter v_0 makes sense a characteristic volume. It is equal

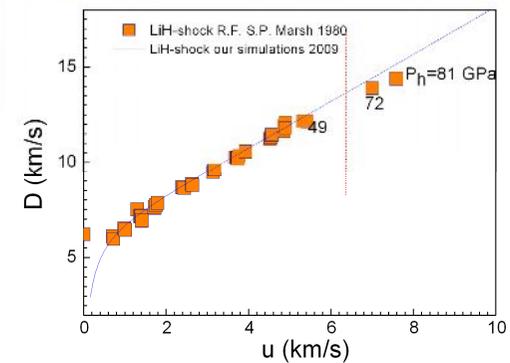
$$v_0 = V_0 \left(1 + \frac{2}{\gamma_0 - 2/3} \right), \quad (3)$$

where $\gamma_0 = \gamma(V_0, T_0)$ is the Gruneisen parameter at initial volume V_0 and initial temperature T_0 . The expression for $E_x = E_x(V)$ is defined as

$$E_x = -v_x (C_1 H_x + C_2 x) + C_3 + E_m, \quad (4)$$

$$H_x = 9 \left(\frac{1}{10} x^{-\frac{2}{3}} + 2x^{\frac{1}{3}} + \frac{3}{2} x^{\frac{4}{3}} - \frac{1}{7} x^{\frac{7}{3}} + \frac{1}{70} x^{\frac{10}{3}} \right), \quad (5)$$

SINGLE SHOCK COMPRESSION of LiH and its SIMULATIONS



ЭЛЕКТРОПРОВОДНОСТЬ ОБРАЗЦОВ ГИДРИДА ТИТАНА (TiH_2)

