

GRAPHENE ON FERROELECTRIC:
PHYSICAL PROPERTIES AND APPLICATIONS

M. V. Strikha

V.E. Lashkaryov Institute of Semiconductor Physics,
Nat. Acad. of Sci. of Ukraine
(41, Nauky Ave., Kyiv-28 03650, Ukraine;
e-mail: maksym_strikha@hotmail.com)

S u m m a r y

A review of works devoted to physical properties and possible applications of graphene on a ferroelectric substrate is presented. Graphene-on-ferroelectric system has several unique features. Among them are the possibility to obtain the high $\sim 10^{12} \text{ cm}^{-2}$ concentrations for the moderate (of 1 V order) gate voltages, and the existence of hysteresis (or antihysteresis) in the dependence of the resistance of a graphene channel on the gate voltage. The use of ferroelectric substrates for graphene had enabled the construction of the robust elements of a non-volatile memory new-generation. These elements work for more than 10^5 switches and preserve information for more than 1000 s. Such systems can be characterized theoretically by the ultrafast rate of switching (~ 10 –100 fs). It is also demonstrated theoretically that the effective, fast and small modulators of the middle- and near-IR radiation for different optoelectronic applications can be constructed on the base of graphene on the $\text{Pb}(\text{Zr}_x\text{Ti}_{1-x})\text{O}_3$ ferroelectric substrate.