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# New methods of creating Si and III-V solar cells and III-V detectors

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**New ways of creating Si and III-V solar cells (SCs) and III-V detectors are considered - Green energy-saving low-temperature technique of p-n junctions fabrication in Si: We developed cheap, low-temperature, energy-saving and environmentally friendly method for forming p-n junctions in silicon for SCs. It is based on the new effect of rapid impurity redistribution in Si through irradiation with low energy (1÷50 keV) undoped ions (for example Ar+) at low temperatures (<60 ) to form p-n junction. This makes it possible to replace the widely used practice of manufacturing p-n junctions technologies based on high temperature, energy intensive and toxic processes. High quality GaAs/Ge/Si structures: The development of III–V SCs on Si substrates provides the following: (a) manufacturing of large SCs (300 mm and higher); (b) significant increase in SCs efficiency (in comparison with Si SCs) without significant net cost rise; (c) SCs weight is cut more than in half (specific weight: Si-2,3; Ge-5,5; GaAs-5,9 g/cm3), this is especially important in aerospace applications. In order to provide high competitive SCs parameters, it is necessary to obtain high-quality III–V films featuring low density of threading dislocations (not exceeding 106 cm-2). We solved this problem. The III-V/Ge/Si structures were used to produce effective III-V solar cells, as well as high-sensitivity THz detectors. Protective anti-reflective YSZ coatings: The advantages of YSZ coatings for photosensitive devices based on Si, Ge, III-V are: (i) thin mirror-smooth uniform YSZ films have high antireflective, stabilizing, protective and insulating properties, high mechanical strength and abrasion resistance, high chemical and radiation resistance; (ii) YSZ film increases the relative efficiency of SCs on Si, III-V compounds; (iii) SCs life time increases.**

## Biography

Alexander N Buzynin graduated with honors from Moscow State University in 1972. His thesis was devoted to the novel phenomenon of graphoepitaxy, and his 1972 publication with N.N. Sheftal was 6 years ahead of the first American work in this area. Until 1984 he worked in the Research Institute of Materials Science; from 1984 till present he has been working in the General Physics Institute, Russian Academy of Sciences. His main areas of scientific interests are research and development of conditions for obtaining structurally perfect single crystals and epitaxial films, development of green semiconductor technologies. He has more than 150 scientific publications and 40 patents.

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