

Past and future half-centuries for semiconductor device development

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Abstract

Electronics is certainly one of the most important technologies emerged in the last century and is expected to further evolve rapidly in the new century. Today, almost all human activities cannot be held without the help of electronics. Electronics started with the invention of vacuum tube about 100 years ago. It developed rapidly with the replacement of vacuum tubes with semiconductor devices in the middle of the last century, and now semiconductor devices are the key for the development of new electronics for future 50 years towards the middle of this century. There have been three aspects for the evolution of semiconductor devices; 1) device structure & operation mechanism, 2) choice of materials, 3) miniaturization of the devices. Already the size of the electronic devices have shrunk more than one million times in the past 100 years from vacuum tube to the most recent CMOS transistors. Now, the miniaturization is approaching its limit, and new paradigm is about to start for the semiconductor device development. In this talk, past 50 years of the semiconductor device development is reviewed and future 50 years for that is predicted.