# Development of Flexible Germanium Device and its Application

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**Abstract**

As the technology developed, Internet of Things (IoT) and the smart devices arouse rapidly. It is an important research to make the devices fit the special surface or shape of appliances in our daily life. Therefore, the flexible devices can play a critical role in near future. Germanium (Ge), a famous high hole mobility semiconductor material, has been used for electronic applications, solar cells and amounts of aerospace devices. In this study, muscovite is used as substrate due to its high flexibility and thermal stability to make a fundamental and simple flexible device. We fabricate epitaxial Ge thin films on muscovite directly with hole mobility of 150 $cm^2$/V-s by the RF sputtering. Furthermore, Ge thin film field effect transistors are designed with $Al_2O_3$ as gate and Pt as electrodes. Besides, the piezoresistive effect of the Ge thin films is also found and can be applied as a flexibility sensor. In summary, the flexible device based on Ge can bring a breakthrough to the development of the next generation technology.

**Keywords**: Flexible, Thin film transistor, Muscovite, Germanium