DRIE / Silicon Ultra Low Temperature Plasma Etching: …Its Applications, Limitations & Evolution

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In recent decades, much research has been done on ways to increase the performance of silicon technologies while reducing their cost of production. In order to remain competitive in the highly competitive market of semiconductor & M(O)EMS (Micro (Opto) Electro Mechanical System), companies must reduce their cost by about 25% per chip per year. To achieve this, many objectives are set as: decreased chip size thanks to the DRIE technology allowing 3D integration, increase the size of substrates, but also process optimization and etching equipment to maximize productivity.

Even if there is some challengers, Deep Plasma Etching becomes a key technique in the fabrication of semiconductor devices for microelectronic companies. The key of future success is the mastering of this unique technology by a better control and widespread use.

To better understand and control this technique one need to know more about: plasma, Hardware, the way of controlling the process to obtain the best performances on etch profile. Nevertheless, even with this, some technical issues & limitations in performance remains. To go further in the mastering, we need also to have a global vision of the whole technique such as process monitoring & profile simulation, in order to lead it to industrialization and make it evolve.