IMPRINT LITHOGRAPHY, INDUSTRIAL PERSPECTIVE

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For more then ten years researchers have been working on developing a low cost lithography technique producing/reproducing nano structure so called Imprint lithography. Today, industrial interest is increasing to evaluate the capability of the technique. Nanoimprint lithography, (NIL) has the inherent potential to be a promising candidate for fabrication of nano and micro devices in parallel. In NIL, pattern is transferred by pressing a stamper (the master) onto a substrate covered with a thin layer of polymer. The package is heated, leaving an imprint of the original on the substrate when the stamper is removed. The stamper is a 1:1 proximity mask and the pattern on the stamper is at the same dimensions as the finished product.

Imprint lithography have been added to the 2003 edition of the International Technology Roadmap for Semiconductors. One of the most important aspects in adding imprint lithography to the road map is the cost perspective, because imprint systems do not require the sophisticated optics, beam control or focusing limitation.

According to SEMI standard, the Imprint was added to the 32-nm node, which means it may be 2013 before imprint lithography is ready for volume production for semiconductor devices. The biggest limitation for the technique is alignment in nanometer resolution, which today is available in the range of sub micrometer. But out side of SEMI arena there are other applications where both nano and microstructure needs to be manufactured in large volume i.e. Hard Disk Drive and Flat Panel Display. The world market for HD is estimated to about 400 million disks during 2004 and the market for OLED displays is projected to about 36,2 million units this year.

Industrial needs for using imprint as a production technique are well known. There should be an infrastructure that makes industrial partners comfortable and secure using this new lithography technique. We will discuss the industrial needs using imprint lithography in production. There are many questions to be answered, one of the most important being who are making the stamper?

Today, there are about twelve imprint lithography tool manufacturers with different focus. However there are only limited numbers of groups that have the capability to make the stampers.