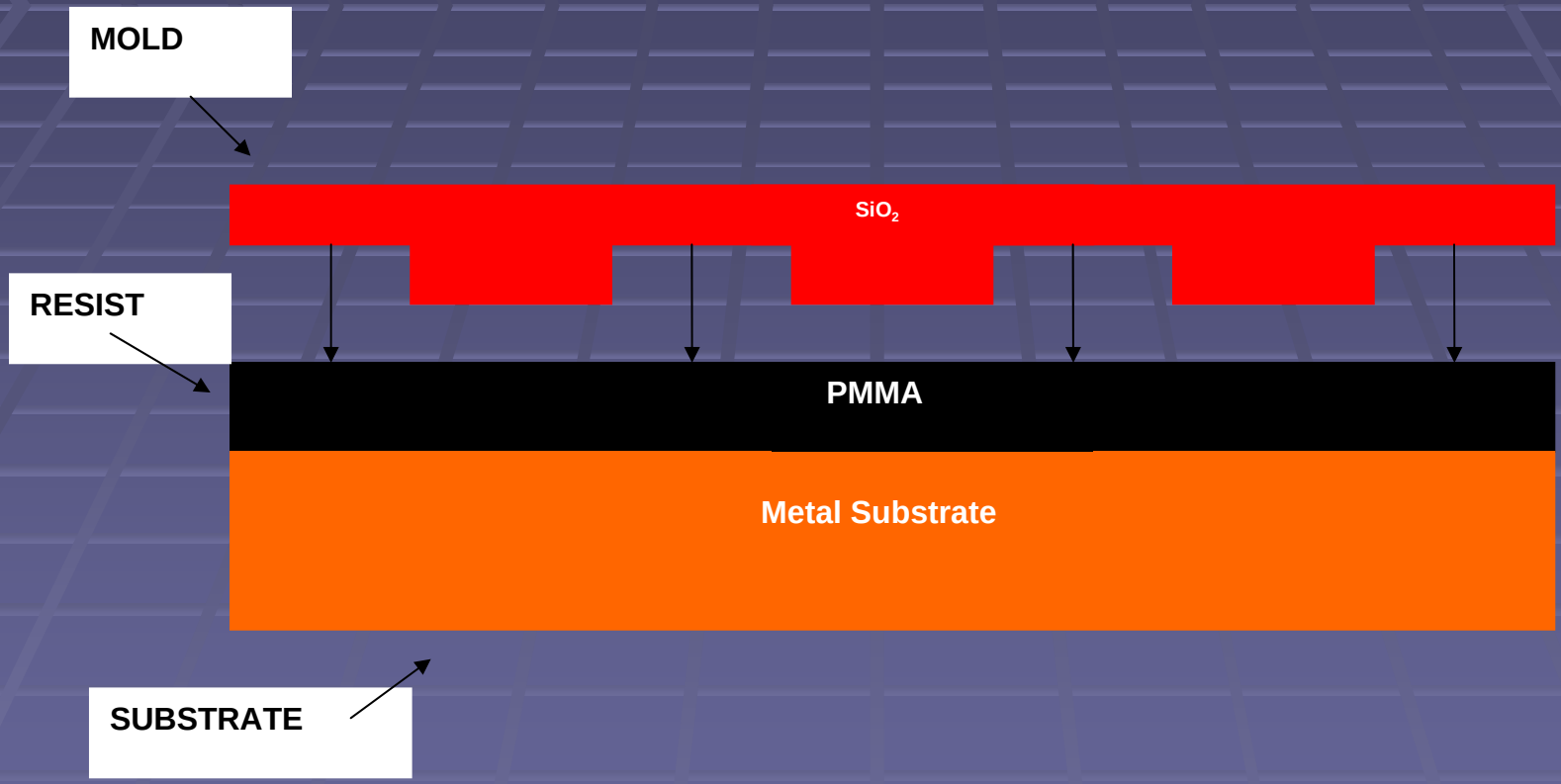
Nanoimprint Lithography (NIL)

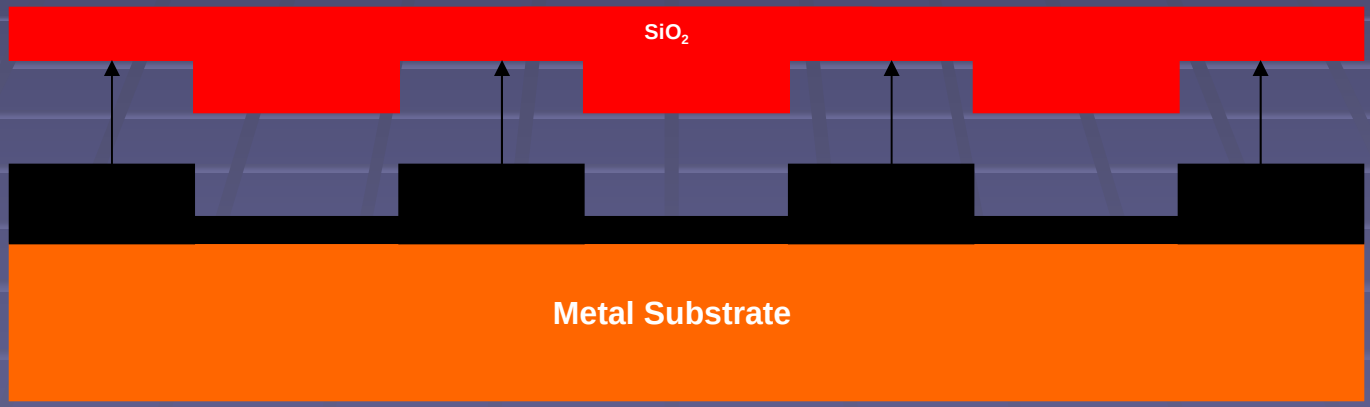
Imprinting

- A mold such as silicon dioxide (SiO_2) is imprinted onto a surface, that is a metal substrate covered with a resistive material such as polymethyl methacrylate (PMMA)
- The resistive material is heated above its glass transition temperature which allows the resistive material to become a thick liquid that can be easily pressed into any shape

Imprinting



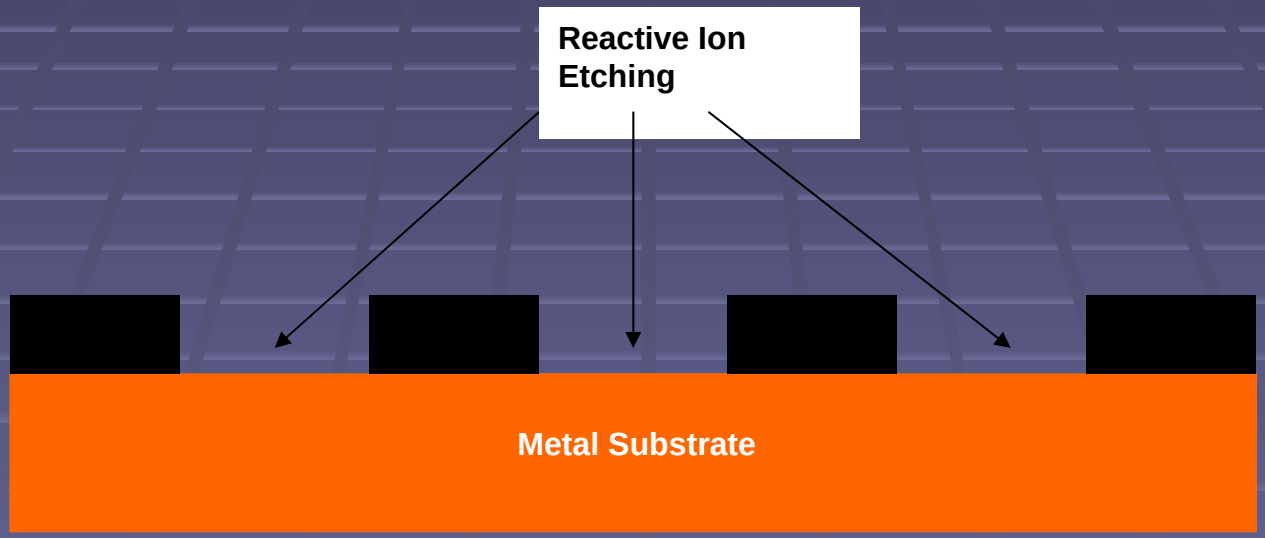
Imprinting



Etching

- An etching process such as reactive ion etching (RIE) is needed to complete the contrast between the resistive material and the metal substrate
- RIE involves a gas that will react with the particular resistive material that will target the compressed areas of the resistive material

Etching



Conclusions

- This process leaves lines of PMMA which can then be used in applications for circuits and computing
- This process is projected to have a minimum measurement of 10nm

References

- S. Chou, P. Krauss, P. Renstrom, 1996, “Nanoimprint lithography,” J. Vac. Sci. Technol. B, Volume 14(6), pp. 4129-4133.
- S. Chou, P. Krauss, P. Renstrom, 1996, “Imprint Lithography with 25-Nanometer Resolution,” SCIENCE, Volume 272, pp. 85-87.