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Photos placed in horizontal position
with even amount of white space
between photos and header

Method for Irradiation and Implantation of HfO₂ Thin Films

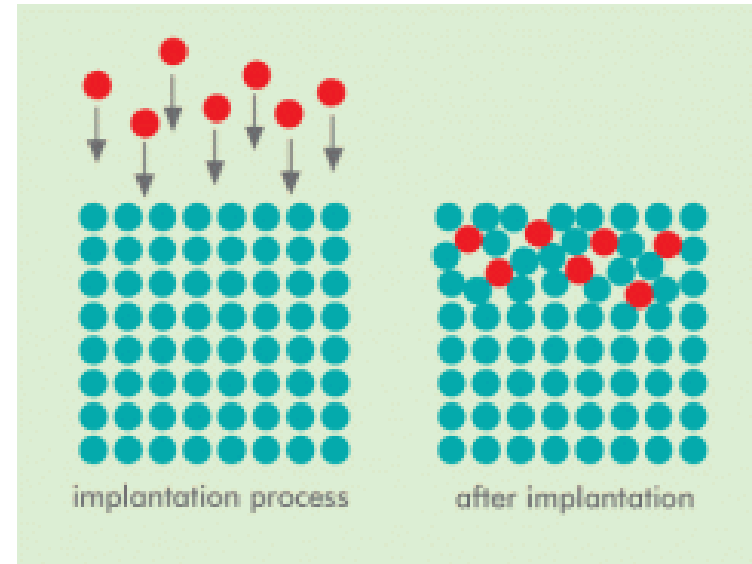
Ann Uribe



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Background

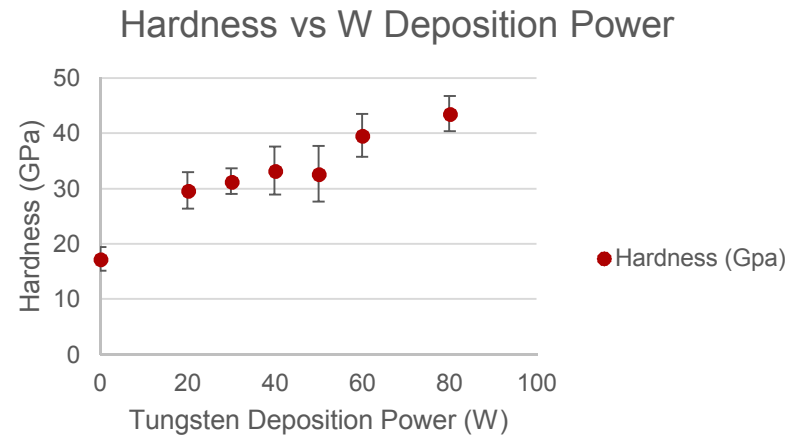
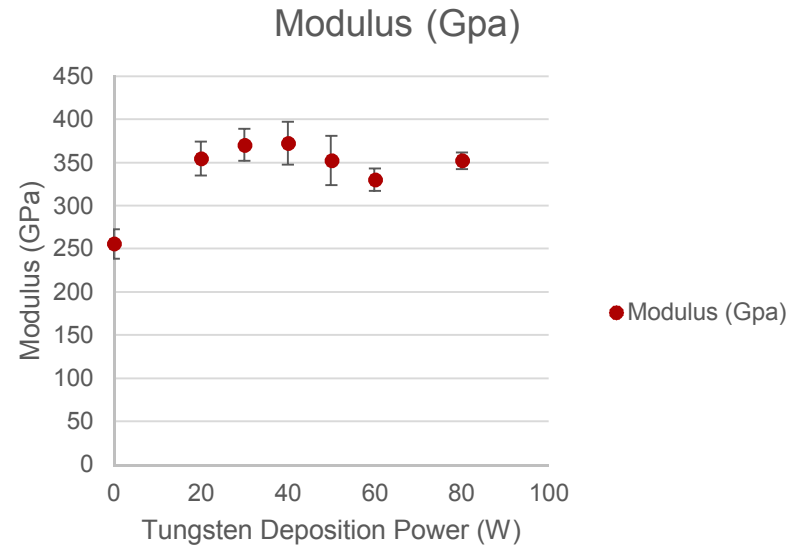
- Ion implantation, what and why
 - Used to introduce dopants into a material system
 - Utilized in the semiconductor industry
 - Low temp process
- Capabilities at Ion Beam Lab at Sandia
 - Multiple accelerators
 - Unique In Situ Ion Irradiation Microscope



<https://matenggroup.wordpress.com/ion-implantation/>

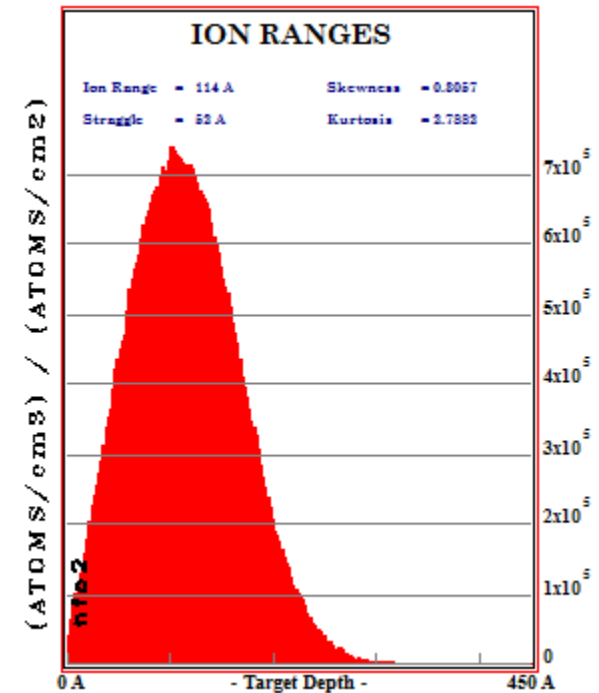
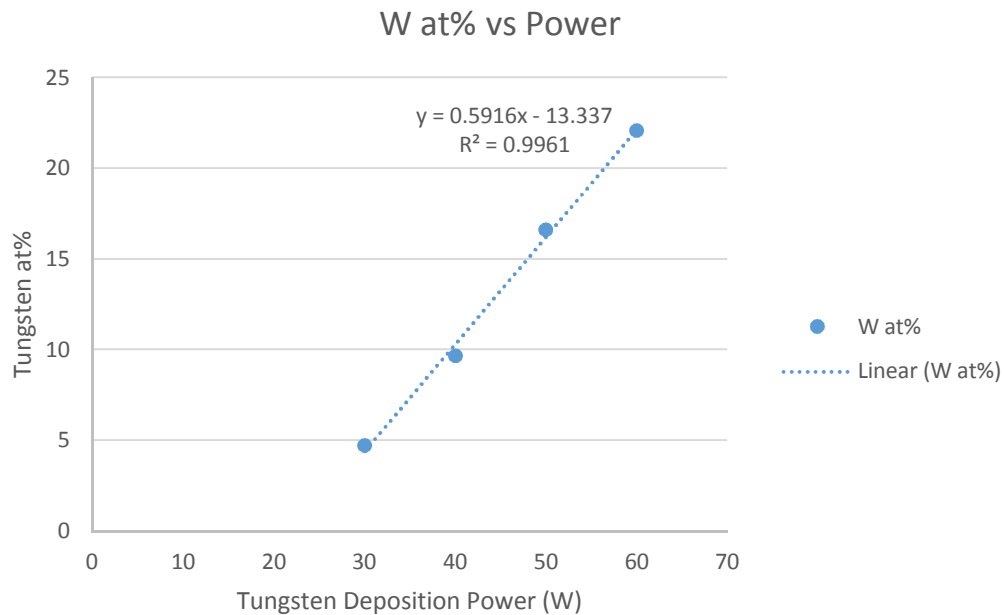
Previous Work

- HfO₂, why study it
 - Characterized by good electronic (high k dielectric) and optical (wide band gap) properties
 - Using tungsten as a dopant may help enhance the mechanical properties moving it toward use in structural materials



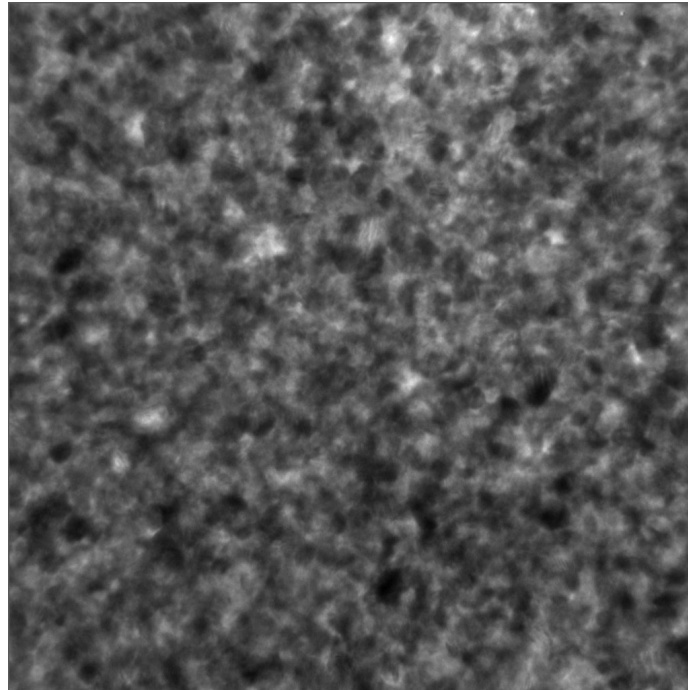
Prep

- Finding suitable substrate
- Finding W% in prior samples using EDS
- Finding ideal way to visualize damage from implantation



Experiment

- Need to switch up implantation method; grains are too small to see any damage in the I3M
- New method: ex-situ implantation followed by annealing to allow grain growth



Conclusion

- Future work
 - Anneal samples and collect images
 - Calculate amount of implanted tungsten vs carbon

Questions