Synthesis of and Structure-Function Relationships in Heterostructures of Quazi-2D Materials

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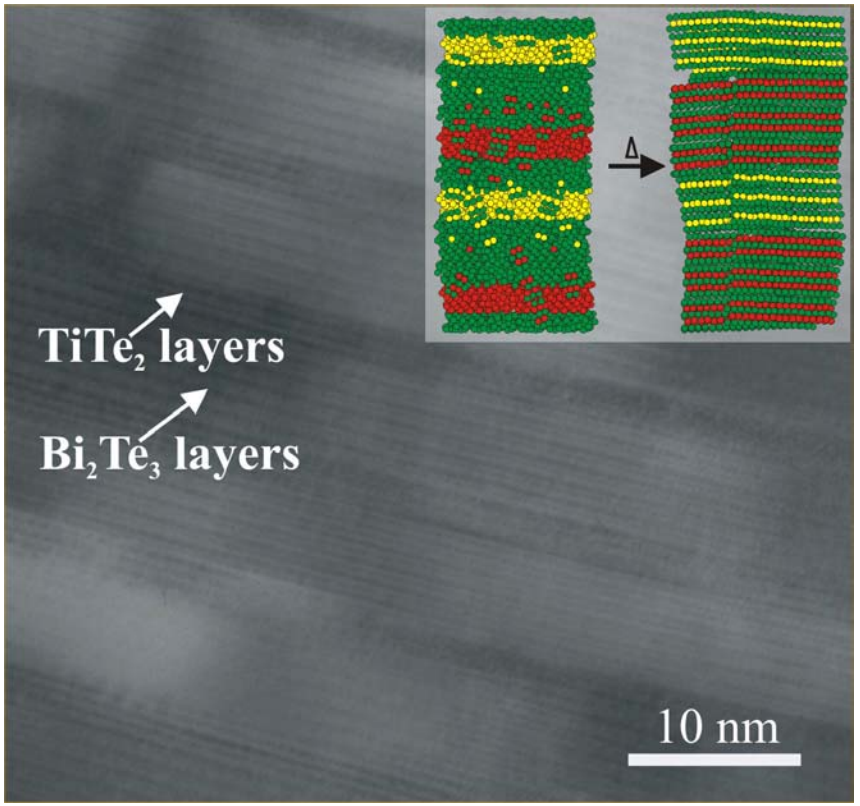
University of Oregon DMR-0103409

Kinetically stable superlattices with designed nanostructure can be formed by low temperature annealing of modulated elemental reactants (inset). The superlattice structure of $[(Bi_2Te_3)_x(TiTe_2)_y]$ is clearly visible in the TEM image. This approach has also been used to prepare $[(CrSe_2)_x(NbSe_2)_y]$ and $[(VSe_2)_x(TaSe_2)_y]$ superlatices



Property measurements as a function of annealing conditions and the nanostructure - the number of layers of the components (ie. Bi_2Te_3 and $TiTe_2$) - are currently underway.

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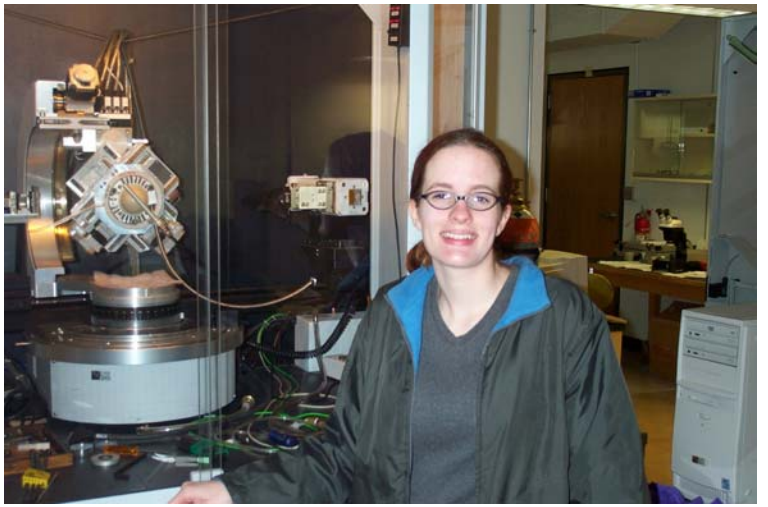
Education:

Seven undergraduates (Stacey Standridge, Carolyn Feik, Mandy Dutton, Samantha Kehoe, Brandon Howe, Kristi Carlson and Astrid Albertini), four graduate students (Fred Harris, Polly Berseth, Ngoc Nguyen and Michael Fenci), one postdoc (Robert Schneidmiller), one research associate (Lance Miller)and one visiting faculty member (Brian McBurnett) contributed to this work. Stacey Standridge and Carolyn Feik are juniors, Brandon Howe is a senior, Mandy Dutton , Kristi Carlson Astrid Albertini and Samantha Kehoe have graduated. Fred Harris and Polly Berseth will receive their Ph.D.'s in the spring and plan to work in industry.

Outreach:

Undergraduates work in a team environment and contribute scientifically as group members.



Stacey Standridge performs an X-ray Diffraction scan