A Survey of Hydrogen in Semiconductors

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Hydrogen is introduced easily into semiconductors either intentionally or unintentionally. Hydrogen is electrically active, can occupy different sites in its different charge states, forms complexes with many impurities and defects, and can also give rise to other H-containing defects such as H_2 molecules. Hydrogen, therefore, has an important effect on the electrical properties of semiconductors and participates in a surprisingly rich variety of phenomena. The technological implications of such effects are now widely recognized, and, for example, have been especially important for the wide bandgap semiconductors that are now used to fabricate visible light-emitting devices. This talk will be a survey of the microscopic properties of hydrogen in semiconductors. A selection of technological applications and problems that involve H in semiconductors will also be discussed.