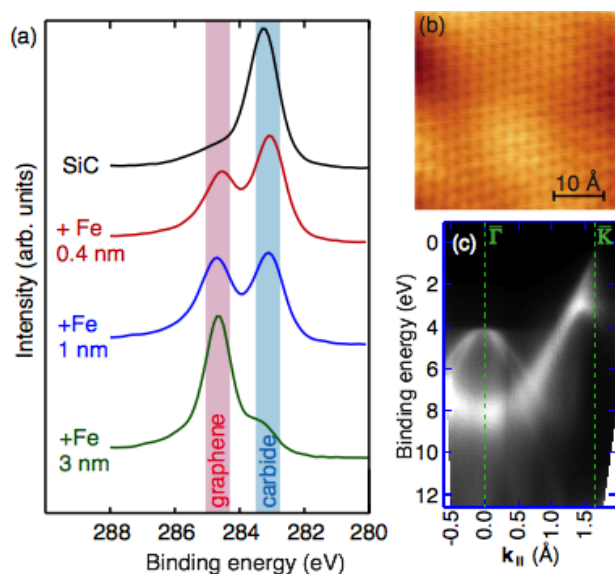


Controlled graphene formation on semiconductors

Graphene has excited much interest for its novel mechanical and electronic properties, and has been proposed as an ideal material for a wide range of applications. In order to capitalise on this, it is necessary to control its growth in an industrially realistic manner on poorly conducting substrates. In this project, we developed a method for growth on diamond and SiC at moderate temperatures, by making use of a chemical intermediate (in this case Fe/FeSix). This allows for graphene-on-semiconductor formation at industrially realistic temperatures, where the thickness and lateral distribution can be controlled by standard lithographies of the intermediate. The work was carried out at the Department of Physics in collaboration with Aberystwyth University, Aarhus University and the MAX IV laboratory.



Figuretext: (a) XPS measurements of the carbide to graphene reaction, showing its dependence on the initial Fe quantity. (b) STM image of the graphene layer formed and (c) ARPES measurement showing the bandstructure of the graphene with its characteristic pi-band reaching a Dirac-point at K.

"Iron-mediated growth of epitaxial graphene on SiC and diamond", S.P. Cooil, F. Song, G. T. Williams, O.R. Roberts, D.P. Langstaff, B. Jørgensen, K. Høydalsvik, D.W. Breiby, E. Wahlström, D.A. Evans, J. W. Wells, Carbon 50 (2012) 5099, Contacts: D. W. Breiby, E. Wahlström and J. Wells.