

## Isotopic labeling of bilayer graphene for advanced studies

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### Abstract

Graphene has been proposed for many different applications, but the lack of a band gap limits its possible uses [1]. It has been found that the band gap of graphene bilayers can be controlled easier than for monolayers [2]. This study is therefore focused on bilayer graphene.

Raman spectroscopy is one of the main characterization techniques of graphene. However, conventional Raman spectroscopy does not allow separation of the different layers in bilayers. We therefore use isotopic labeling, where one layer is constituted of  $^{12}\text{C}$  and the other layer of  $^{13}\text{C}$ , which allows differentiating of the properties of the bottom and top layer. We have used this technique to establish that the adlayer in CVD growth of graphene on copper grows underneath the first layer [3]. We have investigated the different effect heat treatment has on the individual layers [4]. We have also found how fluorination influences the top and bottom layers depending on the stacking order of the bilayer [5].

### References

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