Supplementary Information

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A universal transfer route for graphene

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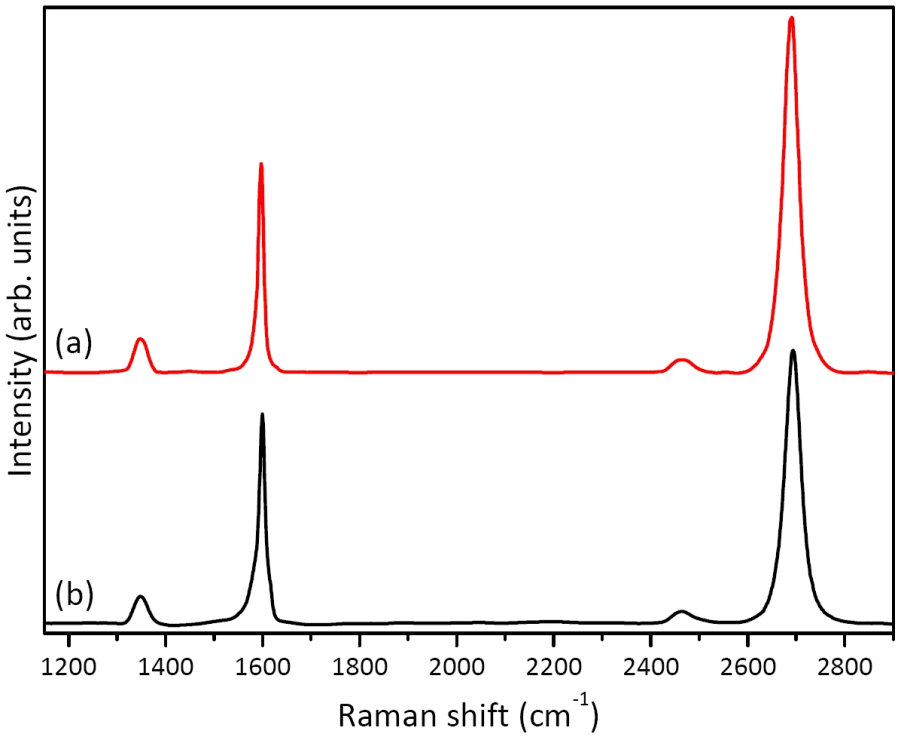

Figure S1. Comparative Raman spectra of the graphene from MoNi transferred on to Si/SiO2 wafer using two different methods. The upper spectrum (a) corresponds to the monolayer graphene transferred using our transfer method and the lower spectrum (b) corresponds to monolayer graphene transferred using the commonly used PMMA-assisted FeCl3 metal etching method[1].

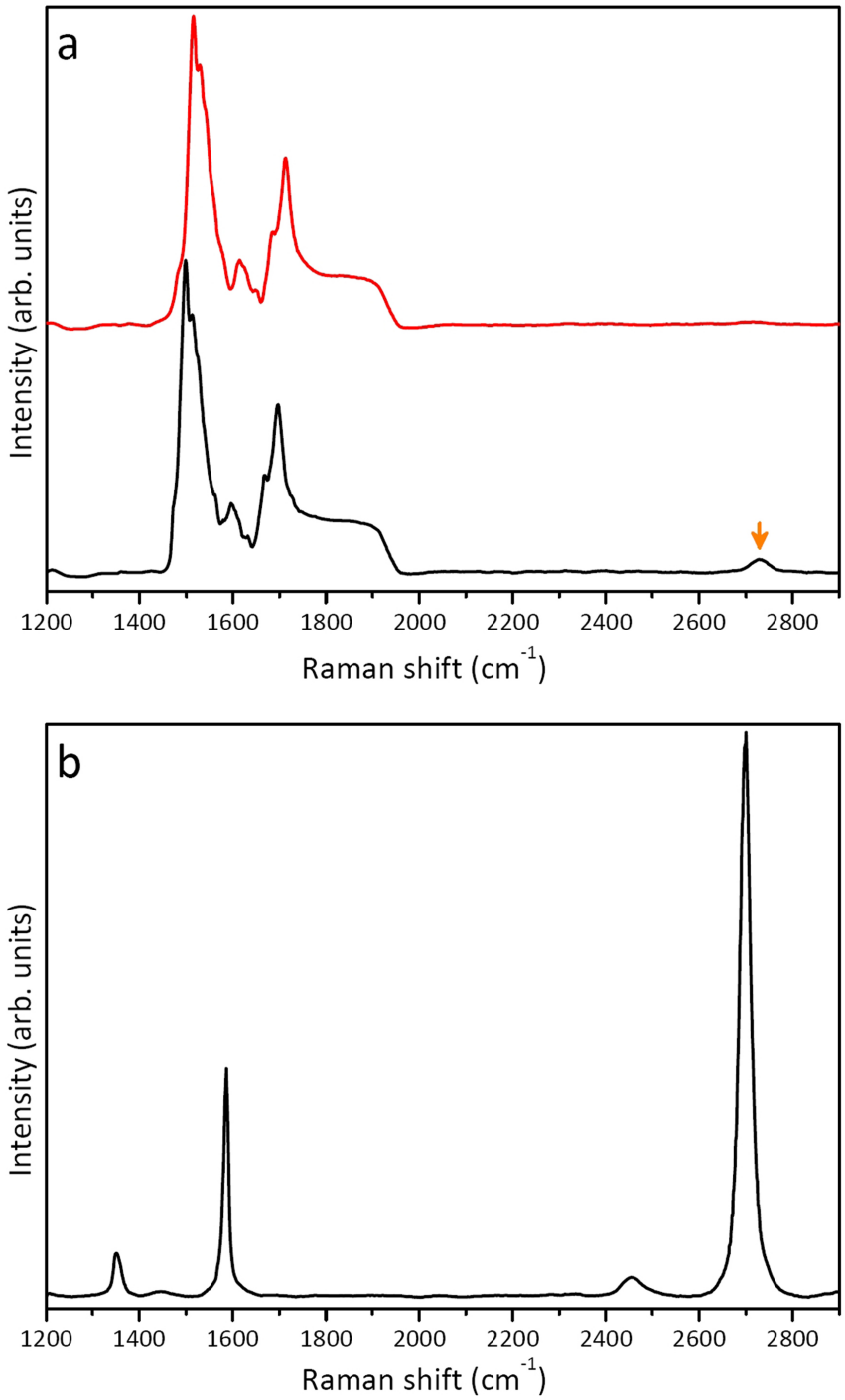

Figure S2. The Raman spectra of the epitaxial graphene grown on SiC and transferred using alternative transfer route. The lower spectrum in (a) shows the typical Raman signal from graphene grown on SiC, the graphene 2D peak is indicated by arrow. The upper spectrum in (a) shows the Raman signal from the same SiC substrate after the transfer of graphene from it using our alternative transfer route. The absence of the typical 2D peak confirms successful transfer of the graphene from SiC. The spectrum in (b) shows Raman signal from this transferred graphene on Si Substrate. The Raman signal is typical of monolayer graphene.

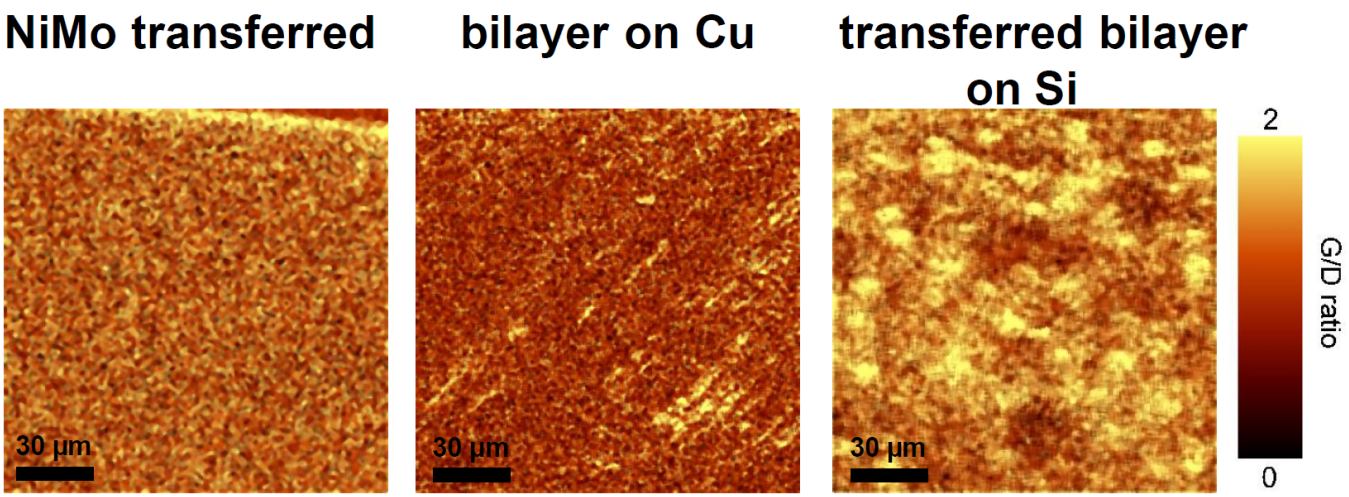

Figure S3. Raman mappings (G/D) ratio from left to right: Raman mapping of transferred monolayer graphene grown over NiMo alloys. The homogenous layer is easily visible. Middle: Bi layer graphene grown over Cu. Inhomogeneous regions are visible. Right: Bi-layer graphene after transfer. Again, inhomogenous regions are also visible. Most of the region shows a high G/D ratio i.e. few defects.

Comment on PMMA graphene lift off

At the end of the bubbling process cycle in our transfer route the PMMA-graphene film separates from the growth substrate and floats on the surface of the bath solution. Occasionally this is not the case, in such a situation it was observed repeating the bubbling process with a fresh dose of the solution is found to result in the detachment of the PMMA-graphene film from the substrate. It is also worth mentioning here that particularly in the case of Al2O3 and SiC substrates it was found that though the PMMA-graphene film is detached it may not naturally lift-off the substrate and float to the surface of the solution due to the surface tension between the substrate and the PMMA-graphene film. In such cases the PMMA-graphene film can be easily released by transferring the substrate with the PMMA-graphene film into a beaker filled with de-ionized water and then gently nudging manually one of the corners of the film with tweezers. The surface tension of the water coupled with the hydrophobic nature of the PMMA-graphene film subsequently aids in naturally lifting the PMMA-graphene to rise and float on the water surface. This is similar to what is reported by Reina et al. in their PMMA-mediated transfer of graphene from micro-cleaved HOPG from Si/SiO2 substrates[2].

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