Palaiseau, May 14 mai 2013

Dr Stephan Hofmann
Department of Engineering
9 JJ Thomson Avenue
Cambridge CB3 0FA
UK

Statement of Support for University of Cambridge EPSRC Capital for Great Technologies Advanced Materials proposal

Dear Dr Hofmann,

Thales is a high technology company with an interest in developing a wide range of electronic materials for defence, security, space, aerospace and ground transportation applications. Thales has an annual turn-over of 13 billion Euros.

Thales has a special interest in advanced materials, such as carbon nanotubes and graphene, and translating them into technology. In particular, Thales is interested in applications of these materials in spintronics, high frequency electronics and optoelectronics. For spintronics, Thales Research and Technology has a unique collaboration in the form of an embedded joint research lab with CNRS. Thales and CNRS have collaborated over 10 years on numerous EC projects with Cambridge University, including in the recent project (GRAFOL), and are also closely involved as an industrial partner on the recent EPSRC GRAPHTED project on Graphene, led by Dr Hofmann at Cambridge.

For this reason, we are very supportive of complementary equipment investment in this area. We think that the advanced characterisation equipment proposed by the University of Cambridge, in particular the near-ambient XPS system, is of high importance to the industrial development of new electronic materials. In fact, our recent joint work with Cambridge on spin-polarized electrodes highlighted how important a tool like high pressure XPS can be to effectively drive device integration of novel materials.

We would be very interested in using the proposed near-ambient XPS system for our work in particular in the framework of our collaboration with Cambridge. Our current on-going projects for spintronics would already benefit from this investment: XPS studies will prove crucial for the burgeoning integration of metallic spin sources with novel materials such as graphene and self-assembled molecules. The availability of this tool would also be a starting point for further collaborations with Cambridge.

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Illustratively this equipment would already serve the following on-going studies where probing the state of interfaces is crucial:

- Passivation of metallic spin sources with non-intrusive impermeable bi-dimensional materials such as graphene. We patented the general concept (patent PCT/EP2012/053127) and published world-first results in collaboration with Dr Hofmann (Dlubak et al. ACS Nano 2012). We now seek to deepen this study, develop it to a wide range of metallic spin sources and integrate it in functional devices.

- Integration of self-assembled molecules in spin devices. We published world-first results demonstrating the pertinence of SAMs for spintronics (Tatay et al. ACS Nano 2012, Galbiati et al. Adv. Mater. 2012), unlocking further chemical-engineering of interfaces spin properties.

- Molecular functionalization and self-assembly on graphene and other bi-dimensional materials (MoS2, silicene…). Bi-dimensionality of these materials renders their electronic/spin properties sensitive to proximity effects. In particular XPS studies will be central to the identification of pertinent compounds and processes to unlock new functionalities for graphene-based devices.

We believe such advanced metrology equipment will play a vital role in implementing new materials in devices developed at the CNRS/Thales joint unit, and that this would have a strongly beneficial effect on the European and UK economy.

Yours sincerely

F. Nguyen Van Dau
Director of CNRS/Thales Joint Laboratory

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