ionbond

Dr. Norbert Schwarzer,
Saxonian Institute of Surface Mechanics
Tankow 2
18569 Ummanz, Ruegen
Germany

**GKL/ 03/01**
Gerry van der Kolk
T +31 77 4 65 65 65
F +31 77 3 51 34 99
gerry.van.der.kolk@ionbond.com

Venlo, 11 March 2013

**Re: Project Pre Standardization of incremental FIB micro-milling for intrinsic stress evaluation at the submicron scale; ISTRESS**

Dear Dr. Schwarzer,

At Ionbond we are active in the field of Surface Engineering. One of our key activities is to provide coating services. We are active in innovation driven industries like Aerospace and Medical implants, but also play a key role in co-developing solutions for automotive in order to reduce fuel consumption.

Our coatings are mainly plasma produced coatings with pronounced nanolayer structures.

Key of our development efforts is to balance between minimum wear characteristics (abrasive wear and impact fatigue wear) and in parallel maximum load carrying capability. I used the word balance as minimum abrasive wear generally requires a high hardness, minimum impact fatigue requires elasticity, and maximum load carrying capacity requires a low E-modulus, so a number of conflicting requirements. One of the tools we use to come to functional solutions is by reducing the cumulative internal stress, by making a stack of different layers. The coatings we presently provide in million pieces per month to automotive, are essentially stacked layers with individual layer thickness ranging from 10 to 500 nm, with at least 5 different layers.

We do make simulations of the layer stacks, and we can do practical tests, which are sometimes very expensive, but we are missing an analysis method to analyse the stress in individual layers.

The program ISTRESS would generate a know-how framework, that would probably allow us in the future to engineer our stack of nano-layers by proper analysis, instead of the present trial and error methods.

We are open to be member of an industrial advisory board, and would definitely make use of a possibility to provide test specimen.

with kind regards

Dr. Gerrit Jan van der Kolk
Chief Technology Officer
Ionbond Group