

## Masterproject - Spring 2011

**Laboratory for Photonic Materials  
and Characterization  
EPFL  
1015 Lausanne, Switzerland**

**Advanced Materials Processing  
Empa Thun  
Feuerwerkerstrasse 39  
3602 Thun, Switzerland**

### **Green process for industrial lubricant cleaning/recycling**

Advanced Industrial lubrication aids, have been developed and commercialized as for example by the company Solvay Solexis. These lubricants are typically composite mixtures of fluorinated oils and solid particles. Perfluorinated fluids, lubricants, and greases are versatile materials used in a broad variety of systems. They play a critical role in the function, lubrication and testing of aerospace, semiconductor, and automotive components where heat stability, purity, and very low toxicity are required. However the major drawback associated with their use resides in the difficulty to remove them from mechanical parts, prior to maintenance operations. The current solution involves the use of ozone-killer halogenated solvents that are to be banned soon, pushing the industry to seek for alternative “green” removal processes.

An innovative “green” solubilisation method has been proposed by Empa, allowing even recycling of the fluorinated lubricants. Preliminary trials have shown promising results. The aim of this project is to explore and investigate further this process. The student will have on one side to investigate the nature of the residual lubricant on the surface of the mechanical parts (SEM-EDXA, analytical spectroscopies etc...). On the other side the student will design and perform series of solubility- recovery tests, and determine the optimal operating conditions, and assess the industrial viability of the process.

The student will work at Empa in Thun in close contact with the Industry. He/she will profit of the in-house experience in chemistry and material science. This work is remunerated.

STI Microtechnique	STI Matériaux	STI Mécanique	STI Electricité & Electronique	SB Physique	SB Chimie
x	xx	x	x	xx	xx

#### **Responsables:**

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