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International Union of Laboratories and Experts in Construction Materials, Systems and Structures
Réunion Internationale des Laboratoires d'Essais et de Recherches sur les Matériaux et les Constructions

RILEM Technical Committee TC 231-NBM *Nanotechnology-based Bituminous Materials*

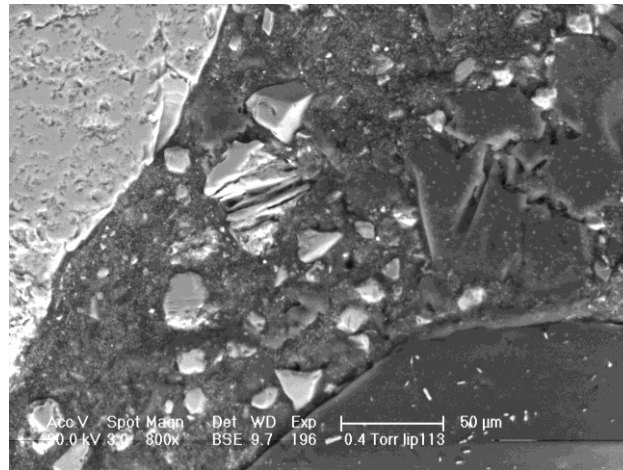
Workshop on

Micro and Nano-Characterization and Modeling of Bituminous Materials

12th and 13th May 2011 at EMPA in Dübendorf, Switzerland,

Organized by RILEM TC 231 NBM *Nanotechnology-based Bituminous Materials*,

Chairman: Björn Birgisson (KTH); Secretary: Lily Poulikakos (EMPA)



Today, the characterization, modeling and design of building materials in the micro and nano range are an indispensable aspect in material science and technology. This development has contributed to fundamental understanding of physical and chemical mechanisms that are the basis for performance, thus generating new exciting avenues for design of materials. However, compared to other materials, such as hydraulic cement concrete, the application of micro and nanotechnology for bituminous materials is still in a very preliminary stage. On the one hand, this is due to the fact that bitumen is a thermo sensitive organic material which has a highly complex and still quite unknown polymeric nanostructure and composition; on the other hand this is due to the fact that bituminous materials require special micro and nano-experimental techniques that are not widely used yet. This Micro-Nano Workshop intends to serve as a path finder event seeking to get an overview of relevant models and advanced characterization techniques that are suitable for bituminous materials. It intends therefore to discuss and find answers to the following fundamental questions:

- 1) What is the downscaling limit of materials models and composition considerations and are there size effects in the nano and micro range?



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Nanotechnology-based Bituminous Materials

- For example: mastic, density, crack and air-voids and the role of particles and bitumen nano-structure

- 2) How can macro phenomena be explained by micro and nano-scale phenomena and how can micro and nano-scale phenomena be modeled and linked to macro-scale models?
 - For example: damage, healing, aging, diffusion, thixotropy, elasticity, plasticity, viscosity, adhesion and cohesion, fatigue on a nano scale

- 3) How can micro and nano-scale phenomena in bituminous materials be measured and observed?