Bitumen Modification Using Organic Montmorillonite

RESEARCH SCHOOL
INTEGRAL DESIGN OF STRUCTURES

Speerpunt BOUW

Subject

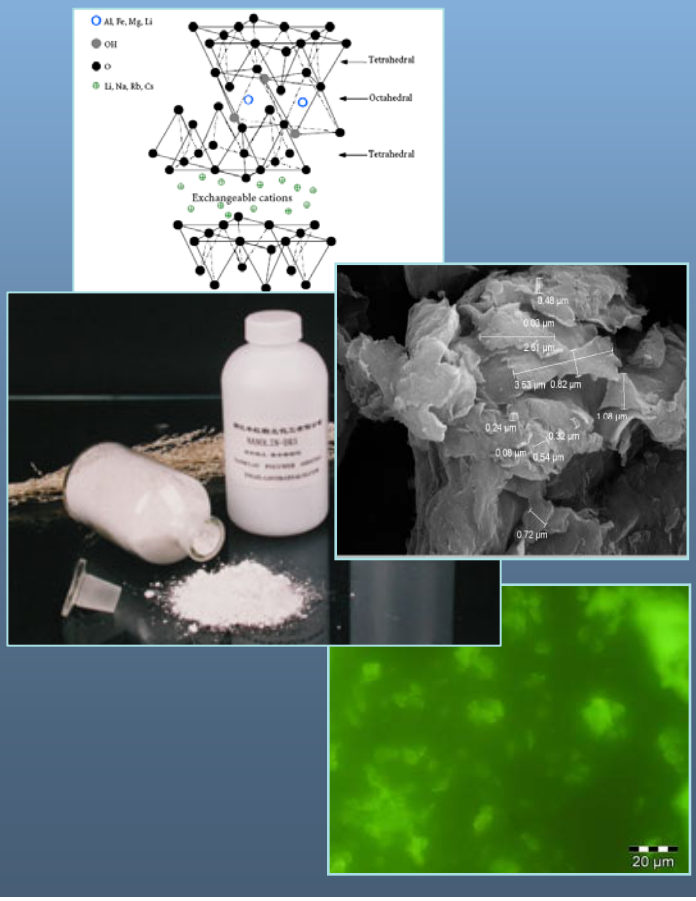
In recent decades, montmorillonite (MMT) nano-clay has been successfully introduced into polymer systems to form polymer-clay nanocomposites (PCN). Some properties of PCN, such as the mechanical, thermal, gas barrier properties, are superior to those of pristine polymers. Similar improvements in the PCN are expected to also be seen in the bitumen with the MMT

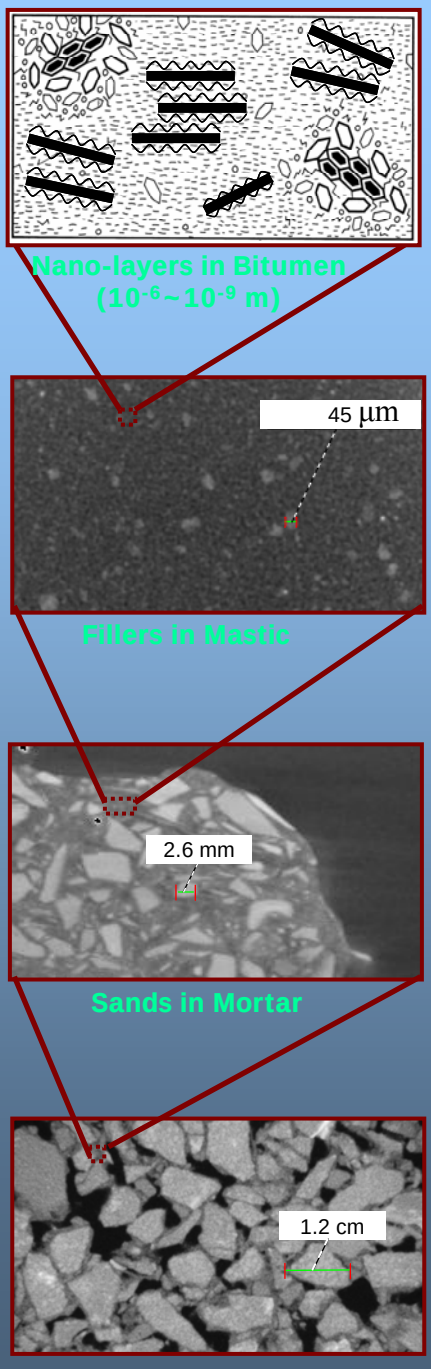
Goals

To characterize the influence of the MMT on the properties of bitumen, mastic, and even asphalt mixture, and find the surfactant on the MMT suitable to the bitumen modification.

Expected Results

A stable MMT-bitumen system with excellent ageing, fatigue properties and rheological behaviours





Researcher	Gang Liu/ gang.liu@tudelft.nl /0152784016
Supervisor	Prof.dr.ir A.A.A.Molenaar/ A.A.A.Molenaar@tudelft.nl/ 0152784812
Program / Subprogram	Pavement materials
Host University	TU Delft / Faculty of Civil Engineering and Geosciences

3TU.

TU Delft

Bitumen Modification Using Organic Montmorillonite

Gang Liu [1], Andre Molenaar [2]

[1] PhD student, Gang.liu@tudelft.nl.

[2] Supervisor, Section of Road and Railway Engineering, A.A.A.Molenaar@tudelft.nl

Faculty of Civil Engineering and Geosciences, Delft University of Technology

Subject

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Research Question

How will the addition of MMT influence the properties of bitumen? What the relationship of the surfactants on the MMT and the bitumen?

Strategy

The morphology of nanoclay in bitumen is portrayed by X-Ray Diffraction (XRD) and Transmission Electron Microscopy (TEM). Rolling Thin Film Oven (RTFO) and Pressure Ageing Vessel (PAV) are adopted to simulate short and long term ageing of the basic and modified bitumens. We will also do some fundamental rheological tests like Dynamic Shear Rheometer (DSR), Bending Beam Rheometer (BBR), and Direct Tensile Test (DTT).

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Preferred Partners Applications / Sponsors

Bitumen Company/ Construction Industry

Prime Publication / Prototyping

"Characterisation of Organic Surfactant on Montmorillonite Nanoclay to Be Used in Bitumen" accepted for inclusion in the special issue of ASCE's "Journal of Materials in Civil Engineering"

"Modification of bitumen with organic montmorillonite nanoclay". AES – ATEMA' 2009 Third International Conference on Advances and Trends in Engineering Materials and their Applications (Montreal, Canada: July 06 -10, 2009)

Research Period

2007 - 2011