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Investigation on asphalt cement properties by adding asphaltene

Alberta in Canada is one of the biggest oil sands reserve in the world. From this, asphalt binder are made and used in roads.

Standard specification for Canada is the one adopted in North America called Superpave. However many studies has shown that it needs improvement, because many cracks appeared earlier than expected in roads in Canada since it has been set up. Since then researcher implemented more accurate tests to have a better approach of asphalt binder performances.

Taking into account these improvements, this research aim at investigating on binders properties by adding asphaltene, a waste from bitumen extraction.

Protocol:

- Adding 5%, 10% or 20% asphaltene into 6 asphalt binders
- Aging samples with RTFO (Rolling Thin Film Oven)
- Aging samples with PAV (Pressure Aging Vessel) for 20, 40 or 60h.

- Tests with DSC (Differential Scanning Calorimeter) on each samples to study properties about crystallisation
- Tests on unaged and RTFO-aged binders with DSR (Dynamic Shear Rheometer) to study properties about high temperature performance grade (HTPG)
- Tests on PAV-aged samples with DSR to study properties about intermediate and low temperature performance grade.

Main results:

- Adding asphaltene seems to improve grade span of asphalt binder.
- No significat deterioration of other properties studied.
- Differences about deterioration state of asphalt binders are related to its source.
- Adding too much asphaltene percentage make asphalt binder less stable in regard to crystallisation.