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Bitumens modified by waste food additive: Antioxidant effects and high rheological

This contribution a reviews the current understanding of bitumen structure and the consequences in terms of properties, with a strong emphasis on the rheological properties. The links between chemistry, structure and mechanical properties are highlighted in the framework of an updated colloidal picture of bitumen [1].

In particular it explores for the first time, the potentialities of additives from natural resources, i.e., non-toxic and eco-friendly biocompatible compounds, acting both as adhesion promoters and as rheological modifiers [2].

We found, in fact, a class of lipophilic food grade compounds to be very efficient as Multi-Functional Additives (MFA) once they were dispersed in hot bitumen solutions in small quantities. Their effect on the high temperature mechanical performance of a tested bitumen has been investigated through time cure rheological measurements and the sol-transition temperature was determined in a wide range of temperatures. The determination of the contact angle between the aggregate surface and modified bitumens, blended with increasing amounts of additives, has been also carried out.

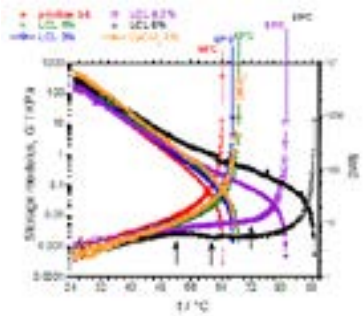

Figure 1: Semi-log plot of temperature ramp tests for the pristine and modified bitumens formulated with 1–6 wt% of phospholipids added as liquid dispersion (LCL)

Recent Publications

1. LesuerD (2009) The colloidal structure of bitumen: Consequences on the rheology and on the mechanisms of bitumen modification, Advances in Colloid and Interface Science 145:42-82
2. Oliviero RossiC, CaputoP, LoiseV, MirielloD, TeltayevB, AngelicoR (2017) Role of a food grade additive in the high temperature performance of modified bitumens, Colloid and Surface A 532: 618–624.

Biography

Cesare Oliviero Rossi, Department of Chemistry and Chemical technologies, University of Calabria, Via P. Bucci, Cubo 14/D – 87036 Arcavacata, Italy Cesare Oliviero Rossi was born in 1974 in Cosenza, Italy and he received his Degree in Chemistry, with full graduating marks and cum laude, from the University of Calabria, in 1997 and his PhD in "Chemical Sciences" at the same University in January 10, 2002, working on structural characterization of lyotropic systems. He worked in different research teams running several research projects, at University of Lund Sweden, University of Coimbra Portugal, ETH Zurich and at High Research Institute of Kazakhstan. He was awarded the gold medal for contribution to the Road Science by High Research Institute of Kazakhstan. Excellent research potential and an ability to actively contribute to projects goals as well as a proven publication track record, i.e. more than 100 papers in international journals. Able to interact with all researchers in a constructive, creative and professional manner. Cesare Oliviero Rossi has his expertise in the study of colloidal systems. He has been trying, in the last years, to approach the bitumen system from a different point of view, to highlight the importance of the chemistry of bitumen and its additives. He attempts to address the problem using chemical investigation techniques that have never been used in the field of asphalt binders.

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