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## Title: UV-CURABLE SILICONE RUBBERS OPEN UP NEW FIELDS

Page Range: p.1-4

Author(s): Ganter B; Bosshammer S; Irmer U

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Journal: International Polymer Science and Technology

Issue Year: ipsat

Volume: 40

Issue No: No.7

### Abstract

The curing characteristics of different silicone rubbers, i.e. UV-curable silicone rubber, platinum-curable liquid silicone

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Progress in Rubber, Plastics & Recycling Technology

rubber and peroxide-curable high-consistency rubber, are discussed in order to demonstrate the advantages of vulcanisation with UV light. The UV curing process is then described, with particular reference to UV lamps, UV-curable liquid silicone rubbers and UV-curable high-consistency silicone rubbers. It is shown that vulcanisation of silicone rubbers using UV light is opening up new areas of application for the rubbers, particularly applications which involve combining the elastomers with heat-sensitive plastics, components, chemicals or medicinal products, which would previously have been destroyed by the high curing temperatures. 3 refs. (Article translated from Gummi Fasern Kunststoffe, No.2, 2013, p.80-82)

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**Title: NEW-GENERATION, HIGH-PERFORMANCE TYRE RUBBERS: THE PRESENT AND FUTURE MARKET FOR SKD-ND (POLYBUTADIENE RUBBER ON A NEODYMIUM CATALYST) AND DSSK (SOLUTION-POLYMERISATION STYRENE-BUTADIENE RUBBER)**

Page Range: p.5-9

Author(s): Mitina I I; Mikhailov S I; Fomina A A

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Journal: International Polymer Science and Technology

Issue Year: ipsat

Volume: 40

Issue No: No.7

#### **Abstract**

Recent tyre legislation in the European

Union, USA, Japan and China, covering rolling resistance, wet road grip, noise, and wear, is discussed. Statistics are presented on actual (2012) and predicted (2016) structure of consumption of synthetic rubbers, on current and future world capacities for DSSK and SKD-ND production, and on the balance of supply and demand for these two rubbers. It is concluded that innovative, new-generation tyre rubbers such as SKD-ND and DSSK will increasingly dominate the market and will be requested by tyre producers. It is expected that, in the medium- and long-term, improved or modified grades of these rubbers will experience significantly greater demand. 9 refs. (Article translated from *Kauchuk i Rezina*, No.6, 2012, p.30-33)

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**Title: FEATURES OF TODAY'S NITRILE-BUTADIENE RUBBER MARKET**

Page Range: p.11-13

Author(s): Kotova S V; Mikhailov S I; Fomina A A

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Journal: International Polymer Science and Technology

Issue Year: ipsat

Volume: 40

Issue No: No.7

**Abstract**

The current market for acrylonitrile-butadiene rubber is discussed. Statistics are given on worldwide consumption of synthetic rubbers by type in 2011, on consumption of NBR by application, on structure of the worldwide production of

mechanical rubber goods, and on worldwide demand and medium-term growth in demand for mechanical rubber goods. Developments in NBR are described, including carboxylated rubbers, epoxy group-containing rubbers, hydrogenated rubbers, 'green' rubbers, and alternating copolymers. 7 refs. (Article translated from *Kauchuk i Rezina*, No.6, 2012, p.33-35)

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**Title: PRODUCTION OF CELLULOSE NANOFIBRES AND THEIR APPLICATIONS**

Page Range: p.15-21

Author(s): Yano H

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Journal: International Polymer Science and Technology

Issue Year: ipsat

Volume: 40

Issue No: No.7

**Abstract**

The various forms of cellulose nanofibres are described and their properties and production are discussed. The literature on the use of cellulose nanofibre as a fibre for reinforcement of structural plastics is reviewed and trends in the development of all-bio composites, e.g. with biopolyamide and polylactic acid, are considered. The production of transparent nanocomposites is outlined. Worldwide trends and future developments are examined. Advantages of cellulose nanomaterials are shown to include high strength, low thermal expansion, carbon neutrality, biocompatibility, recyclability and biodegradability. 12 refs. (Article translated

from Nippon Gomu Kyokaishi, No.12, 2012,  
p.376-381)

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**Title: DIELECTRIC PROPERTIES OF POLYMER  
COMPOSITES BASED ON NITRILE-BUTADIENE  
RUBBER SKN-26 AND POLYVINYL CHLORIDE  
AND CONTAINING NANOSIZED PARTICLES**

Page Range: p.23-25

Author(s): Kumykov T S; Karmov M A;  
Nafonova M N; Tkhakakhov R B; Kunizhev B I;  
Karamurzov B S

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Journal: International Polymer Science and  
Technology

Issue Year: ipsat

Volume: 40

Issue No: No.7

**Abstract**

A study was conducted of the dependence of the dielectric loss tangent and dielectric permittivity of polymer blends based on acrylonitrile-butadiene rubber SKN-26 and PVC and modified with nanosized aluminium oxide and carbon black particles at different concentrations. The results obtained are presented and discussed and it is shown that the change in the dependence of the dielectric loss tangent and dielectric permittivity in the composites with change in the concentration of carbon black and aluminium was connected to the change in the polarisation processes. It was also concluded that the fillers actively interacted with the polymer matrix, the degree of interaction depending on the filler concentration. 7 refs. (Article translated from *Plasticheskie Massy*, No.3, 2012, p.4-6)

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**Title: OPTICAL AND SORPTION PROPERTIES OF FILMS OF POLYVINYL ALCOHOL WITH SILVER NANOPARTICLES**

Page Range: p.27-30

Author(s): Amerkhanova S K; Shlyapov R M; Afanas'ev D A; Uali A S

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Journal: International Polymer Science and Technology

Issue Year: ipsat

Volume: 40

Issue No: No.7

**Abstract**

A study of the optical and sorption properties of films of PVAL containing silver nanoparticles showed that, with increase in the concentration of silver in the polymer film, there was a shift in position of the maximum in absorption spectra into the long-wave region. Bands in the absorption spectra in the range 400-510 nm corresponded to surface plasmon resonance of the silver nanoparticles. It was shown that silver-containing film was an adsorbent in relation in water vapour over saturated solutions of ammonium chloride, potassium nitrate and sodium sulphate, with maximum sorption observed in the case of sodium sulphate. Potential applications, such as in the manufacture of biocidal and antiseptic films and for discrete feeding of drugs, are mentioned. 10 refs. (Article translated from *Plasticheskie Massy*, No.3, 2012, p.12-14)

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**Title: COMPARATIVE ASSESSMENT OF THE POSSIBILITY OF USING GEL FRACTION AND NETWORK DENSITY INDICES TO CHARACTERISE THE DEGREE OF CROSSLINKING AND THE SERVICE PROPERTIES OF RADIATION-CROSSLINKED POLYETHYLENE FOR CABLE INSULATION**

Page Range: p.31-33

Author(s): Lyamkin D I; Skroznikov S V; Zhemerikin A N; Kobets A V; Cherkashin P A; Cherepennikov S V

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Journal: International Polymer Science and Technology

Issue Year: ipsat

Volume: 40

Issue No: No.7

**Abstract**

A study was conducted of the influence of the conditions of radiation crosslinking on the network density and mechanical properties of crosslinked PE (XPE) at high temperatures. The optimum electron radiator generator current and speed of cable drawing that ensured the maximum network density were determined. It was shown that the gel fraction did not fully characterise the degree of crosslinking and the mechanical properties of XPE. The use of the parameter  $n^{\text{c}}$ , the number of moles of chain segments between crosslinked points per unit volume, to characterise the degree of crosslinking and durability of XPE was recommended. 6 refs. (Article translated from *Plasticheskie Massy*, No.3, 2012, p.14-16)

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**Title: INVESTIGATING THE MODIFYING PROPERTIES OF CERTAIN CONJUGATED UNSATURATED ESTERS**

Page Range: p.35-37

Author(s): Veliev M G; Guseinova Z N; Ishchenko N Y; Shatirova M I; Ibragimova A I

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Journal: International Polymer Science and Technology

Issue Year: ipsat

Volume: 40

Issue No: No.7

**Abstract**

A study was conducted of the modification of PE and bisphenol A epoxy resin ED-20 with conjugated unsaturated esters synthesised by the interaction of unsaturated aldehydes with carboethoxymethylene triphenylphosphorane. The structure of the synthesised esters was confirmed by IR and PMR spectroscopy. The physicomechanical properties, e.g. tensile strength, elongation at break and melt flow index, of the modified PE composites were studied. The thermal parameters of decomposition of the modified epoxy composites were examined, including activation energy of decomposition, time of half-decomposition and thermogravimetric index. The results obtained showed that some of the conjugated esters were effective modifiers of PE and epoxy resin ED-20. 11 refs. (Article translated from *Plasticheskie Massy*, No.3, 2012, p.16-18)

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**Title: CALCULATING THE FUNCTIONALITY OF OLIGOMERS WHEN A MIXTURE OF INITIATORS OF DIFFERENT FUNCTIONALITY IS USED**

Page Range: p.39-42

Author(s): Boiko V P; Grishchenko V K

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Journal: International Polymer Science and Technology

Issue Year: ipsat

Volume: 40

Issue No: No.7

**Abstract**

Analytical and graphic dependences are presented for determining the fraction of molecules of oligomers of different functionality and the number-average functionality of oligomers obtained in mixtures of initiators of different functionality. The dependences can be used for practical calculations associated with the production of oligomers with specified functionality and functionality distribution of the molecules. They are also suitable for calculations of oligomers produced using initiators with different functional groups that do not interact during polymerisation but then can be cured by a combined mechanism. 3 refs. (Article translated from *Plasticheskie Massy*, No.3, 2012, p.26-28)

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**Title: PROCESSES OF RELAXATION AND FAILURE IN COMPOSITES WITH A NANOSTRUCTURAL MORPHOLOGY**

Page Range: p.43-48

Author(s): Tkhakakhov R B; Karamurzov B S;

Tkhakakhov E R; Pshikhachev A G

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Journal: International Polymer Science and Technology

Issue Year: ipsat

Volume: 40

Issue No: No.7

### **Abstract**

A study was made of the processes of relaxation and failure in composites based on an 80:20 wt % polymer blend of acrylonitrile-butadiene rubber SKN-26 and PVC with different ratios of the components and different concentrations of nanoparticles of carbon black filler. The structure and the strength, mechanical and surface properties of the composites were investigated under different temperature conditions. With a concentration of 0.271 wt % carbon black in the blend, a maximum value was observed in the curve of the concentration dependence of the tensile stress. Maxima were found in the temperature dependences of tensile stress and tan delta. For the maxima of mechanical losses, there were corresponding strength maxima, and the latter were displaced towards low temperatures. Filling of the blend led to displacement of the maxima on the tan delta-temperature curve towards high temperatures and increased the values of strength and dynamic modulus and also reduced the background of mechanical losses. 10 refs. (Article translated from *Plasticheskie Massy*, No.3, 2012, p.28-33)

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**Title: NEW EPOXY COMPOSITES BASED ON**

**POTASSIUM POLYTITANATES**

Page Range: p.49-51

Author(s): Mostovoi A S; Plakunova E V;

Panova L G

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Journal: International Polymer Science and Technology

Issue Year: ipsat

Volume: 40

Issue No: No.7

**Abstract**

The possibility of using polytitanates as fillers was studied. The dispersion of potassium titanate was carried out in the plasticiser trichloroethyl phosphate, which ensured retention of the particle size after dispersion. Plasticisers such as tricresyl phosphate and trichloroethyl phosphate, which also contained combustion inhibitors, were introduced into the epoxy resin composite to increase elasticity. The tests conducted demonstrated that the structure formation processes and the properties (bending stress, impact strength, hardness, frictional properties, and oxygen index) of the epoxy composite could be controlled by introduction of small amounts of potassium polytitanates. 3 refs. (Article translated from *Plasticheskie Massy*, No.3, 2012, p.33-35)

**Title: WATER-REPELLENT GRAFT  
ORGANOSILOXANE COATINGS WITH  
DODECYLALKENYL SULPHIDE GROUPS ON  
THE SURFACE OF FIBROUS MATERIALS**

Page Range: p.53-56

Author(s): Rodlovskaya E N; Izmailov B A;

Vasnev V A; Baranov O V; Yambulatova O V;

Mishina E S

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Journal: International Polymer Science and Technology

Issue Year: ipsat

Volume: 40

Issue No: No.7

### **Abstract**

A method was developed for the layer molecular assembly of graft organosiloxane coatings with dodecylalkenyl sulphide groups on the surface of fibres of textile materials. Details of the method are given and data are presented on certain parameters of fibres of textile materials (cotton, part wool) used in the synthesis of fixed organosiloxane coatings with dodecylalkenyl sulphide groups, and conditions of their production. The possibility of the practical use of these materials for water-repellent finishing of textile materials was demonstrated. Data are presented on the water-repellency properties of modified fabrics and of these properties after five washes and heat treatment. 12 refs. (Article translated from *Plasticheskie Massy*, No.3, 2012, p.35-38)

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**Title: FAILURE OF POLYMER CONSTRUCTIONS IN CORROSIVE MEDIA**

Page Range: p.57-61

Author(s): Aristov V M; Aristova E P

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Journal: International Polymer Science and

Technology  
Issue Year: ipsat  
Volume: 40  
Issue No: No.7

### **Abstract**

The types of failure in the presence of a corrosive medium of constructions manufactured from polymeric materials, developed for use in the chemical industry, were analysed. Recommendations were made for determination of the life of constructions of polymeric materials. It was found that a corrosive medium could lead to a significant change in the nature of failure of polymeric materials and that cracking began both as a result of the development of initial crack-like defects present on the surface of the polymer under exposure to a medium and mechanical stresses and as a result of the appearance of new surface cracks during the service life of the construction. Crack development under exposure to a medium already occurred in the working range of values of tensile stresses and led to rapid failure of the construction. In calculation of the life of a polymer construction, therefore, the possibility of the occurrence of cracking should be taken into account. 5 refs. (Article translated from *Plasticheskie Massy*, No.3, 2012, p.38-42)

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