TITLE COMPARISON OF COUPLING EFFECTIVENESS AMONG AMINO-, CHOLO-, AND MERCAPTO SILANES IN CHLROPRENE RUBBER
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ABSTRACT Organoalkoxysilane was grafted onto the surface of precipitated silica (PSi), and the modified PSi was characterized by particle size analysis, DRIFT and 29Si NMR spectroscopy. There were 3 types of organoalkoxysilane used in this work, namely, 3-aminopropyl triethoxysilane (APTES), 3-chloropropyl triethoxysilane (CPTES) and bis (3-triethoxysilylpropyl) tetrasulfide (TESPT). The magnitude of the Payne effect, bound rubber content and mechanical properties of chloroprene rubber (CR) filled with unmodified and silane-modified PSi were investigated. Results reveal that the type of silane coupling agent (SCA) affects not only compound processability, but also mechanical properties of the CR vulcanizates. Among the 3 SCAs, it is evident that APTES and TESPT are capable of reducing the filler-filler interaction more efficiently than CPTES, as evidenced by Payne effect results, leading to superior compound processability. Mechanical properties of the CR vulcanizates filled with APTES-modified and TESPT-modified PSi are also greater than those filled with CPTES-modified PSi. This might be ascribed to the combined effects of enhanced rubber-filler interaction and improved filler dispersion.