

**SURFACTANT-OIL-WATER SYSTEMS NEAR THE AFFINITY INVERSION.  
PART VIII: OPTIMUM FORMULATION AND PHASE BEHAVIOR OF  
MIXED ANIONIC-NONIONIC SYSTEMS VERSUS TEMPERATURE**

R. E. Antón<sup>(1)</sup>, A. Graciaa<sup>(2)</sup>, J. Lachaise<sup>(2)</sup>, and J. L. Salager<sup>(1)</sup>

(1) Lab. FIRP, Ingeniería Química, Univ. de Los Andes, Mérida 5101 Venezuela

(2) LTEMPM; CURS, Univ. de Pau et des Pays de l'Adour, Pau 64000, France

**ABSTRACT**

Surfactant-oil-water systems with a phase behavior insensitive to temperature and composition can be achieved by anionic-nonionic mixing. By using of a linear mixing rule and a linear temperature dependency, it is possible to interpret most of the features exhibited by the experimental phase behavior data obtained with sulfonate and ethoxylated alkylphenol mixtures. Deviation from the theoretical model are probably due to anionic and nonionic groups association which reduces the overall hydrophilic character.

**INTRODUCTION**

It has been known for a long time that an increase in temperature turns an anionic surfactant more hydrophilic, while making an ethoxylated nonionic less hydrophilic. Changing temperature is a way to produce a phase transition [1, 2], and Shinoda and coworkers have been using such a method for several decades since they introduced the Phase Inversion Temperature (PIT) concept [3,4].