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SPECTRA 2.3-Carbon nano fiber additives to improve battery performance for electric vehicle recharge infrastructure

The main objectives of this research is to enhance charge acceptance, performance and durability of lead batteries by using new carbon nano fiber materials with high surface area and electrical conductivity as additives in the manufacture of positive and negative electrodes. In order to achieve these goals the following scientific and technological challenges are considered: Making optimum dispersion of small carbon particles in aqueous solutions; investigating the interaction of the high surface area carbon particles with organic polymers; understanding the influence of carbon on the electrochemical performance of PbC electrodes; developing new paste formulation to enhance charge acceptance of the negative electrodes without increasing the maintenance needs (negligible water loss along battery life); improving inter-particle conductivity allowing higher charge currents under partial state of charge conditions (or after rest periods) that usually produce heavy sulfation; and enhancing durability and cycle life of lead batteries by the incorporation of carbon nano particles into the active materials. This work package is integrated in the project SPECTRA (Smart Personal CO₂-Free Transport), consortium recently created by 8 companies and 10 R&D centers and funded by the Spanish Center for Technological & Industrial Development (CDTI). The carbon nano fibers are being developed by Grupo Antolín (Burgos) and the research activities will be made in cooperation with two public institutions: GAIKER (Technology Center, Bilbao), that will perform the studies to achieve a good dispersion of the carbon particles in the active materials; and UAM (University of Madrid), that will conduct electrochemical studies to determine the effect on charge acceptance and hydrogen evolution (water consumption) of PbC cells. Once the optimum combination of additives is screened from the electrochemical studies, Exide will manufacture Enhanced Lead Carbon Batteries to be tested in EV recharge installations by Fagor Electronica (Mondragon).

Biography

Francisco Trinidad is working as a Doctor in Electrochemistry and received his MSc and PhD degree at the University of Madrid. He joined Tudor Group in 1977 and served as Research Laboratory Manager in Azuqueca, Spain and Development Director for the Industrial Division in Soest, Germany. After Exide acquisition of several battery groups in Europe (Tudor, Ceac, BIG, Hagen, Deta), he was nominated as Research Director in Paris, France and later Development Director Transportation Europe. In the actual position, he is responsible for basic research, including R&D labs and basic processes in Exide Europe. He is author of more than 60 papers and 20 patents, and has made numerous presentations on battery technology and related conferences. After more than 39 years of experience with several electrochemical systems, he is a worldwide recognized battery expert in the industry.

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