**Electronic Semiconductor Characterization Using Reverse-Back Procedure Based on Neural Networks and Photoacoustic Response**

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In this paper, electronic semiconductor characterization using reverse-back procedure was applied to different photoacoustic (PA) responses aiming to find effective ambipolar diffusion coefficient and a bulk life-time of the minority carriers. The main idea was to find the small fluctuations in investigated parameters due to detecting possible unwanted sample contaminations and temperature variations during the measurements. The mentioned procedure was based on the application of neural networks [1]. Knowing that in experiments the contaminated surfaces of the sample can play a significant role in the global recombination process that we are measuring and that the unintentionally introduced defects of the sample crystal lattice could vary the carrier lifetime by several orders of magnitude, a method of PA signal adjustment by the reverse-back procedure is developed, based on the changes of the carrier electronic parameters. Such changes are detected (Fig.1) and calculated here by analyzing PA signal amplitude ratios *A*ANN / *A*exp and phase differences **ANN – **exp obtained using experimental (exp) and network predicted (ANN) thermal and geometrical parameters of the sample [2]. The values of photogenerated carrier lifetime and ambipolar diffusion coefficient obtained by the presented method can be used in the quality control procedure of the investigated samples, active control of the experimental conditions and within the general characterization process of semiconductors.



Fig. 1.a) Amplitude ratios and b) phase differences between ANN and experimental (exp) photoacoustic signal prediction of different sample thicknesses in frequency domain used for electronic parameters calculations.

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