

**Research Advisor's Review of the Dissertation Thesis  
of Mrs. Ing. Inas Faisal Abuetwirat,  
and of the candidate's activities and work during her PhD studies  
“Dielectric properties of thin tantalum and niobium oxide layers”**

Mrs. Ing. Inas Faisal Abuetwirat was born in 1980 in Tripoli, Libya. In 1999 she finished the secondary school. In the course of the years 1999–2003 she studied at the Higher Teacher Preparation Institute at Tripoli and she graduated with the B.Sc. Degree in Physics. Then she went on with her studies at the Faculty of Electrical Engineering and Communication, Brno University of Technology in 2004–2006. She finished in 2006 with the M.Sc. Degree in Microelectronic devices. She is married and has 3 children, two boys and a daughter. Her native language is Arabic, she speaks English and Czech.

Since her admission to the PhD studies at the Faculty of Electrical Engineering and Communication, Brno University of Technology in Brno, Czech Republic, in 2008, Mrs. Ing. Inas Faisal Abuetwirat, started to actively pursue the Dielectric Relaxation Spectroscopy. She studied its theoretical foundations and started to carry out her first experiments on the measuring apparatus already available.

She gained a good hands-on experience in sample preparation, manipulation with cryostat and testing measurements at polyethylene. She also substantially extended her knowledge and experience with computer work. I particularly appreciate that she mastered some basic rules of the research work, like search for the previous results in scientific literature, adoption of the best experimental practice from elsewhere in contrast to developing everything from the very start, necessity to quest for new findings in contrast to mere compilations and, last but not least, assuming responsibility for her own work and for “selling” its results to the scientific community.

Mrs. Ing. Inas Faisal Abuetwirat, started at the Department of Physics with measurements on hafnium dioxide and tungsten trioxide, which were at that studied because of their potential application for cold emission cathodes. In this work she developed her experimental skills. At a later stage of her work, she switched over to the study of tantalum and niobium capacitors. She published her results at a number of conferences and she also spent one month abroad at the University of Augsburg in Germany.

I am of the opinion that Mrs. Ing. Inas Faisal Abuetwirat, managed to master a broad range of topics associated with her studies. In her thesis she presents a comprehensive treatise on the dielectric measurements on tantalum and niobium electrolytic capacitors. After a brief introduction she presents the current state of the art in dielectric relaxations spectroscopy. In the further part of her thesis she explains the structure of these capacitors as well as their application. After another short chapter containing an overview of objectives she describes the experimental equipment, her results and finally presents her conclusions. Here it is necessary to say that the conclusions given by the candidate are her own and that they therefore represent her own contribution to the advancement of our knowledge of tantalum and niobium capacitors.

In conclusion, I am of the opinion that Mrs. Ing. Inas Faisal Abuetwirat did a serious work. I recommend the Board of Examiners to accept the thesis and to award her with the degree “Philosophiae Doctor” (PhD).

In Brno, December 10, 2014

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