

## Scientific Report – Short Visit Grant (17 Oct 2005 – 28 Oct 2005)

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The purpose of the visit was to continue in study of elementary processes in positive corona discharge fed by carbon dioxide with water vapours. Seven different amounts of water vapours (from 50ppm up to 1650ppm) were added to carbon dioxide and influence of water to discharge and discharge products was observed. Extraordinary behaviour of positive corona discharge in this gas mixture was discovered during previous visit. Now it has been studied in detail.

When discharge is set on in closed reactor filled in by mixture of carbon dioxide and water vapours the discharge will switch itself off after a few seconds period and later it switches itself back on. These pulses are repeated and the time of the period is shortened. This behaviour was discovered during my previous visit to the Open University. During my last visit it was studied experimentally in detail. Mixture of carbon dioxide and suitable amount of water vapours was prepared and the discharge tube was filled by this mixture. The time dependence of current and transmittance of UV light through the reactor was measured and saved simultaneously. Ozone concentration was calculated from saved data of transmittance. This was done for three different voltages and for seven different amounts of water vapours added to carbon dioxide. The preliminary results show some relationship between pulse period time, ozone concentration and water concentration. Detailed analysis of data will be finished as soon as possible.

In the future the cooperation will continue to obtain more information about characteristics of carbon dioxide with mixture with water vapours and both positive and negative corona discharge. Carbon dioxide is one of the green house gases. It is one of the most important reasons why it is necessary to be familiar with its characteristics. These measurements will be done at Comenius University in Bratislava and at the Open University in Milton Keynes also.