

## THE INDUCTION PLASMA, A POWERFUL TOOL FOR MATERIALS SYNTHESIS AND PROCESSING

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Over the past six decades a sustained interest was maintained in the inductively coupled plasma identified by Babat in 1945. Figure 1 shows a photograph of our first inductively coupled plasma torch developed at the University of Sherbrooke in 1975. This was based on a simple concept of air-cooled quartz plasma confinement tube. My personal work in this area has continued for more than four decades aiming at a better understanding of the fundamentals of the discharge under these conditions and the development of scaled up industrial worthy designs of the induction plasma torch as we know it today. A significant effort was also devoted to the development of industrial applications of this device for the synthesis and treatment of high purity materials. These led to the development of the well known process of powder spheroidization and purification as well as the plasma synthesis of nano-materials. Numerous other applications of induction plasma technology were also developed by many researches and industrial organizations world wide. These included such applications and the over-cladding of fiber optics performs which has been used on a commercial production for many years. The purification of solar grade silicon is another example of high end application of induction plasma technology. To this, one has to recognize equally the use of induction plasmas for aerospace testing of materials and the plasma spraying and deposition of refractory metals for such applications as X-ray targets. In the present lecture, a review will be made of high lights of development of the induction plasma over the years and where do we stand in terms of utilization of this technology on an industrial scale. Emphasis will be placed on the unique features of the induction plasma that makes it such a powerful tool for materials synthesis and processing.

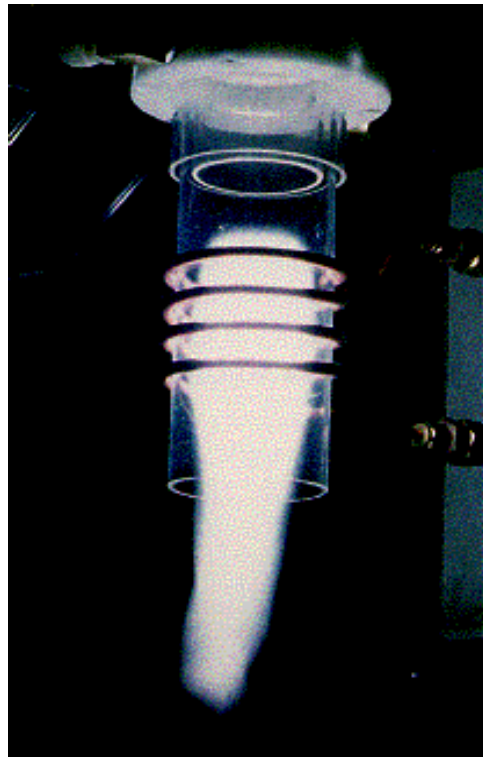


Figure 1. Photograph of the induction plasma as developed at the University of Sherbrooke in Québec Canada in 1975.