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M. Hitchman, S. Shamlian

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Some considerations of MOCVD for the preparation of high T_c thin films

M.L. HITCHMAN and S.H. SHAMLIAN

Department of Pure and Applied Chemistry, University of Strathclyde, 295 Cathedral Street, Glasgow G1 2XL, United Kingdon

Abstract

The deposition of inorganic compounds is important for preparation of high T_c superconducting films. Currently the best quality high T_c films are prepared by laser ablation. As the demand for large area samples, high deposition throughput, good intra- and inter-sample uniformity of layers on patterned structures increases then CVD has the potential to become a powerful technique for prepairing thin films of superconducters. However, although a significant number of papers have been published on the CVD of high T_c layers there are still problems associated with the reproducibility of growth and control of the stoichiometry of layers. These problems often arise because of an inadequate understanding of the chemistry and kinetics of deposition. Therefore if materials of improved quality are to be produced then it is clearly important that a better understanding of the chemistry of layer growth is obtained. In this presentation some results for the CVD of high T_c materials will be discussed and, in particular, we shall give some interpetations and modelling based on analyses of the kinetics of the deposition processes. Some aspects of precursor chemistry will also be discussed and some suggestions will be given for strategies for control of layer growth and improving layer quality.