

FAILURE ANALYSIS OF GREEN CERAMIC BODIES DURING THERMAL DEBINDING

Rajiv M Sachanandani

Dr. Stephen Lombardo, Thesis Supervisor

ABSTRACT

In industry, thermal debinding is the traditional mode of binder removal from multilayer ceramic capacitors (MLCs). Binder removal from ceramics takes as long as 50-150 h, thereby contributing significantly to the manufacturing costs and also controlling the production rate. Increasing energy costs and demand for multilayer ceramic capacitors calls for the development of rapid binder removal cycles. These cycles should not only be fast but also result in a defect free ceramic capacitor. Defect formation, which arises from excessive stresses, plays a major role in determining the duration of the heating cycle. This thesis presents failure behavior of green MLCs as a function of changing body size and heating rate. This is then used to design rapid heating cycles. Furthermore, models are presented to qualitatively analyze the failure behavior in terms of the stresses and strength of the green body.