CONVOCATORIA DE PROCESO SELECTIVO PARA INGRESO, POR EL SISTEMA GENERAL DE ACCESO LIBRE, EN LA ESCALA DE CIENTÍFICOS SUPERIORES DE LA DEFENSA, RESOLUCIÓN 400/38449/2021, DE 16 DE DICIEMBRE (BOE nº 312 de 29.12.2021). TRIBUNAL CALIFICADOR NUMERO 1.

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The advance of gas turbine engines and the increase in fuel efficiency over the past 50 years relies on the development of high temperature materials with the performance for the intended services. During the service of an aero engine, a multitude of material damage will be induced to the components. The endurance of the gas turbine engine to high temperature is particularly marked by the creep resistance of High Power turbine blade alloy.

Nowadays, the state-of-the-art turbine blade alloys are single crystal Ni-base superalloys, which are composed of intermetallic precipitates in a solution-strengthened matrix, solidified in the crystallographic direction. Turbine disc alloys are also mostly polycrystalline Ni-base superalloys. Compressor materials can range from steels to titanium alloys, depending on the cost or weight-saving concerns in land and aero applications. Coatings are often applied to offer additional protection from thermal, erosive and corrosive attacks. In general, the advances in gas turbine materials are often made through thermomechanical treatments and/or compositional changes to suppress the failure modes found in previous services, since these materials inevitably incur service-induced degradation, given the hostile (hot and corrosive) operating environment.

Therefore, the potential failure mechanisms and lifetimes of gas turbine materials are of great concern to the designers, and the hot-section components are mostly considered to be critical components from either safety or maintenance points of view. Because of its importance, the methodology of life prediction has been under development for many decades. The early approaches were mainly empirically established through numerous material and component tests. However, as the firing temperatures are increased and the operating cycles become more complicated, the traditional approaches are too costly and time-consuming to keep up with the fast pace of product turn-around for commercial competition.