HIGH TEMPERATURE COMPOSITE OVERVIEW IN FRANCE

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Exactly 40 years after the first production of a high temperature composite material in France, this presentation recalls the history of the development of the related technologies and applications.

We will describe how, under the leadership of Société Européenne de Propulsion (SEP) until 1994 and since then of the SAFRAN Group, different families of composites were successively developed and brought to an industrial stage: carbon fibers reinforced carbon, carbon fibers reinforced ceramic, ceramic fibers reinforced ceramics, reaching in 2017 a total volume of production of more than 1,000 metric tons per year.

The main current applications of these composite materials will be presented: for defense and space, for aeronautics, for braking systems, for other industrial domains.

The various processes mastered to manufacture the parts will be briefly described: preforming (weaving, 3D weaving, filament winding or placement, needle punching, etc.), interphase deposition, carbon densification routes (chemical vapor infiltration, pitch or resin polymer impregnation and pyrolysis, film boiling, etc.), ceramic densification routes (chemical vapor infiltration, polymer impregnation and pyrolysis, melt infiltration, etc.)

Our industrial view of the main scientific and technological challenges to meet will conclude the presentation.