Project title **and acronym (if any)**	Use of Nano-Hybrid Systems in Carbon Fiber Reinforced Polymer Matrix Composites (CFRP) for Interfacial Toughening
Project web site (if any)	
Funding organization(s)	TÜBİTAK
Project no	214M1140
Project leader **contact information**	Name : Bora MAVİŞ Address: Hacettepe Üniversitesi Makine Mühendisliği Bölümü Ofis No: A-314 06800/Beytepe/Ankara Phone : 0312 297 62 10 E-mail : bmavis@hacettepe.edu.tr Web: http://lidya.hacettepe.edu.tr/~bmavis/a/en/
Project team	Research Scientist : Asst. Prof. Dr. Erhan BAT Advisor: Prof. Dr. Güngör GÜNDÜZ Scholarship Students: Melike KILIÇOĞLU Cansu ÇAYLAN
Budget	506.187,00 TL
Start-finish date	15/04/2015 – 15/04/2017

Project summary

Composite materials are used in increasing quantities in aerospace applications due to their strength, hardness, corrosion resistance, wear resistance, specific weight, and fatigue strength which are higher than those of conventional materials. On the other hand, obstacles against use of composites still exist. Production costs can be considered as the biggest problem among them. The damage mechanisms seen due to the layered structure of composites can also decrease the fatigue life and a problem that is awaiting for a proper solution. Eliminating the most common damage type in composite materials, delamination, is an important goal to achieve.

One of the most efficient methods to solve this problem is increasing the interlayers' mechanical properties by placing electrospun nanofibers at interlayer without causing a considerable thickening of cross-sectional area and increase in the weight of composite. Studies on the toughening effect of nanofibers hybridized with reinforcements that activate toughening mechanisms are scarce.

In this project, a thermoplastic polymer will be hybridized by adding a reinforcing material which will then be formed into nanofiber by using electrospinning process. By placing these hybrid nanofibers in the midplane of carbon fiber reinforced polymer matrixes (CFRP), an enhancement in the interfacial toughness of composites is aimed. The new interface materials that will be developed in the project, are expected to increase the interfacial fracture

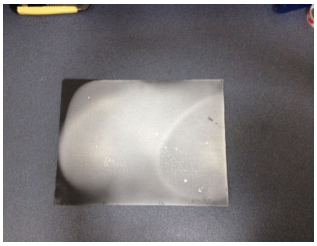
toughness and enhance the fatigue life.

Scientific, technological, economic and social gains obtained or expected by the project

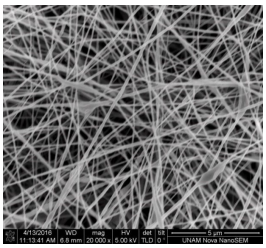
Achieving an increase on the interlaminar toughness without causing a significant decrease on the other specific mechanical properties would be a substantial scientific gains of the project which can find applications on technological ground.

Publications derived from the project

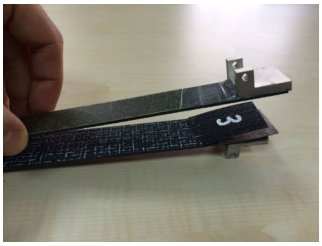
Figures and images related to the project



(a)



(b)



(c)

Figure 1. (a) ve (b) Polymer electrospun on prepreg in preliminary trials, **(c)** Test numunesi.

Figure 2. Testing machine