ends **304** of waveguides **302** are located at particularly sensitive or critical areas of wing **300**. The inward ends **306** of waveguides **302** are connected to monitoring system **308**. Monitoring system **308**, shown schematically in FIG. **7**, comprises a source of ultraviolet light **310** optically connected to the inward ends **306** of waveguides **302**. Ultraviolet light from source **310** is conducted by waveguides **302** to the remote ends **304** where it irradiates the composite material at the sensitive or critical areas of the wing. Under the excitation or stimulation of the ultraviolet light the composite material or the viscosity-dependant fluorescent material therein, fluoresces. This light is conducted back along waveguide **302** to inward end **306**. The fluorescent light is passed through a filter **312** which only transmits the wave lengths of interest and is focused as with lens **314** onto a photodiode detector **316**.

The resulting signal from detector **316** is analyzed and compared to a norm. This can conveniently be done with a microprocessor **318**. Microprocessor **318** can be preprogrammed to evaluate changes in fluorescence of the composite. Decreases in fluorescence are caused, for example, by water absorption, thermo-oxidation of the composite, or increased temperature. Increases in fluorescence are caused, for example, by over curing and embrittlement of the composite. Microprocessor **318** can be preprogrammed to evaluate these changes during the use of wing **302** and give appropriate warning when the condition of wing **302**, as determined by fluorescence, deteriorates to an unacceptable condition for anticipated in-service conditions.

There are various changes and modifications which may be made to applicant's invention as would be apparent to those skilled in the art. However, any of these changes or modifications are included in the teaching of applicant's disclosure and he intends that his invention be limited only by the scope of the claims appended hereto.

I claim:

1. An improved method of forming a composite material into a desired shape by shaping the composite material and curing it, the improvement comprising the steps of:

monitoring the fluorescence of the composite with a fiber optic waveguide to measure viscosity;

adjusting the cure conditions in response to the measured viscosity or degree of cure according to a predetermined cure cycle.

2. The improved method of claim **1** wherein the temperature of cure is adjusted in response to the measured viscosity according to a predetermined cure cycle.

3. The improved method of claim **1** wherein the steps of monitoring the fluorescence comprises:

providing at least one viscosity dependent fluorescent substance in the composite material;

conducting excitation energy to the composite material with a fiber optic waveguide;

conducting emitted fluorescence from the composite material with the fiber optic waveguide;

measuring the emitted fluorescence of the composite material;

translating the measured value of emitted fluorescence into a measure of viscosity.

4. The method of claim **3** wherein in the translation of the measured value of fluorescence into a measure of viscosity is according to the relation $\Phi = c\eta^n$ where Φ_F is fluorescent yield, C is a constant for the viscosity-dependent fluorescent substance, η is viscosity, and η is a constant for the resin.

5. The method of claim **3** wherein the translation of the measured value of emitted fluorescence into a measure of viscosity comprises comparing the measured value of emitted fluorescence with a predetermined calibration table of corresponding viscosities.

6. The method of claim **3** wherein the emitted fluorescence is measured by measuring the intensity of the emitted fluorescent.

7. The method of claim **6** wherein the emitted fluorescence is measured by measuring the intensity of the emitted fluorescence in the range of the wavelength of the maximum emission intensity, L_{max}^{em}.

8. The method of claim **3** wherein the emitted fluorescent light is measured by measuring the wave length of the maximum emission intensity, L_{max}^{em}.

9. The method of claim **8** wherein the excitation energy is ultra violet light of wavelength in the range causing emission at the maximum intensity, L_{max}^{em}.

10. The method of claim **3** wherein the excitation energy is ultraviolet light.

11. The method of claim **3** wherein at least two viscosity-dependent fluorescent substances are provided in the composition, each of said substances having a relatively large fluorescence in a different range of viscosity.

12. The method of claim **3** wherein the emitted fluorescence is measured by measuring the wavelength of the maximum emission intensity, L_{max}^{em}.

13. The method of claim **12** wherein the excitation energy is scanned over a range of discrete wave lengths; the emitted fluorescence is measured to determine the wavelength of maximum emission intensity, and wherein the measured value being the wave length of maximum emission intensity, L_{max}^{em}.

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