CLAIMS

1. An ultrasonic transducer for structural health monitoring, comprising:

a piezoelectric film comprising polylactic acid having aligned molecular chain orientation;

a first electrode on a first surface of the piezoelectric film; and

a second electrode on a second surface of the piezoelectric film,

wherein in use, the ultrasonic transducer is mechanically coupled to a structure for structural health monitoring and is configured to generate or detect a guided shear wave, and wherein the aligned molecular chain orientation of the polylactic acid is parallel with or perpendicular to a propagation direction of the guided shear wave.

2. The ultrasonic transducer of claim 1, wherein the polylactic acid is selected from a group consisting of poly(L-lactic acid) (PLLA) and poly(D-lactic acid) (PDLA).

3. The ultrasonic transducer of claim 1 or 2, wherein the piezoelectric film is of a circular shape and the aligned molecular chain orientation of the polylactic acid is in a circumferential direction of the piezoelectric film.

4. The ultrasonic transducer of any one of the preceding claims, wherein at least one of the first and second electrodes is a layer having a comb-shaped pattern.

5. The ultrasonic transducer of claim 4, wherein fingers of the comb-shaped electrode layer have a periodicity corresponding to a wavelength of the guided shear wave.

6. A method for structural health monitoring, comprising:

mechanically coupling at least one ultrasonic transducer of any one of claims 1 to 5 to the structure;

generating a guided shear wave propagating through the structure;

detecting the guided shear wave; and

comparing an ultrasonic signal of the detected guided shear wave to a baseline signal of the structure in a reference condition to determine presence of a defect in the structure.

7. The method for structural health monitoring according to claim 6, wherein the step of generating the guided shear wave propagating through the structure comprises:

applying an electric field across the first and second electrodes of a first ultrasonic transducer to induce a strain in the piezoelectric film of the first ultrasonic transducer to generate the guided shear wave.

8. The method for structural health monitoring according to claim 6 or 7, wherein the step of detecting the guided shear wave comprises:

measuring an electrical signal output from the first and second electrodes of a second ultrasonic transducer.