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**HUANG et al.**(10) **Pub. No.: US 2022/0352870 A1**(43) **Pub. Date: Nov. 3, 2022**(54) **COMPOSITE SUBSTRATE, SURFACE  
ACOUSTIC WAVE RESONATOR, AND  
FABRICATING METHODS THEREOF**(71) Applicant: **Ningbo Semiconductor International  
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Ningbo (CN); Fei QI, Ningbo (CN)**(21) Appl. No.: **17/867,629**(22) Filed: **Jul. 18, 2022****Related U.S. Application Data**(63) Continuation of application No. PCT/CN2020/  
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A composite substrate, a surface acoustic wave resonator and their fabricating method are provided. The fabricating method of the composite substrate includes: providing a first substrate; forming a liner layer including at least a polycrystalline material layer on the first substrate; depositing a piezoelectric sensing film for generating acoustic resonance on the polycrystalline material layer by a physical or chemical deposition method; and performing recrystallization annealing treatment on the piezoelectric sensing film, to make the piezoelectric sensing film reach a polycrystalline state. The recrystallization annealing treatment includes a heating process and a cooling process, and the heating process includes heating the piezoelectric sensing film to make the piezoelectric sensing film reach a molten state.

