Non-destructive inspection of polymer sample using a periodically moving heating source

Titre	Non-destructive inspection of polymer sample using a periodically moving heating source
Type de publication	Communication
Type	Communication avec actes dans un congrès
Année	2017
Langue	Anglais
Date du colloque	17-19/05/2017
Titre du colloque	Fifth International Symposium Frontiers in Polymer Science
Auteur	Perez, Laetitia [1], Vergnaud, Alban [2], Aubreton, O [3], Gillet, Mathieu [4], Autrique, Laurent [5]
Pays	Espagne
Ville	Séville
Mots-clés	Active thermography [6], Frequency domain [7], mobile heater [8], Non-destructive inspection [9]
Résumé en anglais	Introduction The development of innovative materials with specific properties requires the design of non-destructive testing methods. The proposed study is focused on the localization of a possible defect in a polymer sample. In such an aim, a frequency analysis based on a periodic heating can reveal the defect location (see authors previous works). However this approach is usually time-consuming and this feature could reduce the method attractiveness in an industrial context. In the proposed communication, a new protocol has been developed in order to reduce the inspection duration. Methods Let us consider that the material to be studied is a polymer plate. On the upper face of this plate, a radiative heater is considered. Its power supply is kept constant. Its spatial distribution is limited to a disc of small radius r. Moreover, this source moves circularly so as to heat the plate. Once the steady state established, the temperature at each point of the sample is periodic. The frequency of the oscillations is related to the angular velocity of the source. Two observable characteristics of these "thermal waves" can then be taken into account at each point of the surface: the modulus and the phase shift of the thermograms. It has been shown that modulus is more relevant for defect location. Results and Discussion An example of thermograms is shown on figure I. The contrast distribution (difference of two cartographies of modulus with and without defect) is presented on figure II. Considering this numerical example, the whole plate inspection is performed and methods feasibility is exposed. Several concrete results based on our experimental device will be exposed during the conference.
URL de la notice	http://okina.univ-angers.fr/publications/ua16686 [10]

Lien vers le document en ligne	http://www.rsc.org/events/detail/24674/fifth-international-symposium-fro... [11]

Liens
[1] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=1862
[2] http://okina.univ-angers.fr/avergnaud/publications
[3] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=27899
[4] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=2442
[5] http://okina.univ-angers.fr/l.autrique/publications
[6] http://okina.univ-angers.fr/publications?f%5Bkeyword%5D=24192
[7] http://okina.univ-angers.fr/publications?f%5Bkeyword%5D=24193
[8] http://okina.univ-angers.fr/publications?f%5Bkeyword%5D=24194
[9] http://okina.univ-angers.fr/publications?f%5Bkeyword%5D=24191
[10] http://okina.univ-angers.fr/publications/ua16686
[11] http://www.rsc.org/events/detail/24674/fifth-international-symposium-frontiers-in-polymer-science