ADHESION CHARACTERISATION IN INKJET PRINTING

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INTRODUCTION

Inkjet printing (Figure 1) is a versatile process, with applications covering a broad spectrum. Printed electronics is one such field where inkjet printing, due to its suitability, flexibility and relative simplicity, finds its application. Typically, metal nanoparticle based inks and polymer based inks are used in inkjet printed electronics to fabricate conducting tracks and circuit components (e.g. resistors, capacitors etc.), respectively.

OBJECTIVE

The principal objective of this research is to understand and characterise the adhesion between printed tracks/components and substrate in a quantitative, qualitative and comparative manner. Since the durability and utility of inkjet printed electronics hinges on the extent to which the printed entity attaches itself to the substrate, this characterisation is of paramount importance.

METHODOLOGY

Scotch tape test, a qualitative test, and Pull - off test, a quantitative test, are used to determine the adhesion between a rigid substrate and the printed entity (Figure 2). For the sake of comparison, spin coated substrates, with layers spun using the same inks as the ones used in inkjet printing, are tested as well. A difference in adhesion values is expected, as spin coated layers are more continuous than their inkjet printed counterparts (Figure 3).

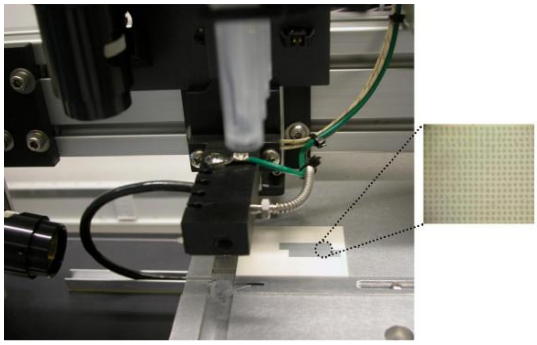

Figure 1: Inkjet printing at University of Twente with MicroFab® Jetlab - IV®

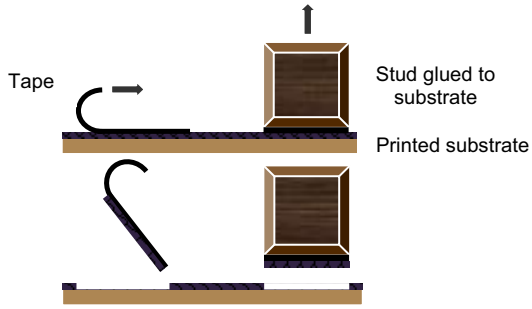

Figure 2: Scotch tape test and pull-off test before (top) and after testing

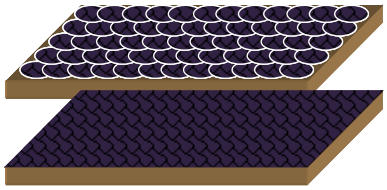

Figure 3: An illustration of spin coated (foreground) and inkjet printed substrates

REFERENCES

1. ASTM D4541