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(54) **A METHOD, APPARATUS, AND ASSEMBLY FOR THERMALLY CONNECTING LAYERS WITH THERMAL INTERFACE MATERIALS COMPRISING RIGID PARTICLES**

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(57) **ABSTRACT**

A die of a circuit assembly and an upper layer of a circuit assembly are thermally connected by applying a thermal interface material (TIM) on the die, such that the TIM is between the die and an upper layer. The TIM comprises an emulsion of liquid metal droplets, rigid particles, and uncured polymer. The method further comprises compressing the circuit assembly thereby deforming the liquid metal droplets and forming a bondline distance between the die and upper layer that 90% to 110% of the average particle size of the rigid particles. An average particle size of the liquid metal droplets in the thermal interface material prior to applying is greater than the average particles size of the rigid particles. The thermal interface material is cured thereby forming the circuit assembly.