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## Linking functional properties of transition metals to growth parameters

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In the race for improved renewable electricity generation, transition metals find one of their many applications, as back contacts for thin film solar cells. The requirements for the transition metals to be an eligible back contact, are manifold. The back contact layer should be chemically inert, an impurity-diffusion barrier, must exhibit good electrical properties[1]. Besides all requirements, the influence of the microstructure and texture of the thin film on the functional properties remain a controversial topic[2].

Within our research strategy, the influence of the thin film's texture and microstructure is broken down to more fundamental parameters of the film formation, i.e. the growth parameters of the sputtered thin film. The two main constituents of the growth process during magnetron sputtering, are the energy flux towards the substrate, and the arriving particle flux[3]. In this work, transition metal thin films are deposited under varying deposition conditions by changing the distance-pressure product and the balancing of the magnetron. The latter was previously proven to have great influence on the deposition conditions[4]. To determine the fundamental growth parameters, the energy flux towards the substrate and the deposition rate were determined for all conditions. Using these, correlations and trends are ascertained for some intrinsic and functional properties like grain size and resistivity of the thin film.

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### Keywords

Transition Metal

Back Contact

Energy Flux

Thin Film Growth

Magnetron Sputtering