

## INTISARI

Penggunaan *Rare Earth Elements and Yttrium* (REY) mengalami peningkatan yang signifikan terutama digunakan pada industri material tingkat tinggi dan diproyeksikan akan semakin meningkat hingga beberapa puluh tahun mendatang. Semakin tingginya kebutuhan REY maka diperlukan adanya sumber alternatif dari REY, salah satunya berasal dari batubara dan abu hasil pembakaran batubara. Formasi Warukin di Cekungan Barito merupakan salah satu formasi pembawa batubara yang menarik untuk dikaji lebih dalam karena kondisi geologinya yang dapat mengayakan REY pada batubara. Penelitian ini bertujuan untuk mengetahui konsentrasi dan moda keterdapatan REY pada batubara di daerah penelitian serta proses geologi yang mempengaruhinya. Pengambilan data lapangan dilakukan dengan metode *ply by ply sampling* yang dilanjutkan preparasi sampel untuk analisis geokimia *Inductively Coupled Plasma - Mass Spectrometry-Atomic Emission Spectrometry* (ICP-MS/AES), petrografi organik, *Scanning Electron Microscopy-Energy Dispersive X-Ray Spectroscopy* (SEM-EDX) dan analisis proksimat.

Secara keseluruhan pada batubara daerah penelitian terdapat empat kenampakan litotipe yaitu *bright coal*, *dull coal*, *bright banded coal* dan *dull banded coal*. Komposisi maseral yang menyusun batubara daerah penelitian ialah vitrinit (58,03% vol.), liptinit (23,56% vol.), inertinit (18,17% vol.) dan mineral (0,23% vol.). Kadar abu batubara memiliki kelimpahan yang cukup tinggi yaitu 1,36 – 15,45 (wt%, adb) dengan nilai rata-rata 4 (wt%, adb). Perkembangan *paleomire* di beberapa *seam* juga cukup bervariasi, berupa *topogenous* hingga *ombrogenous mire*. Nilai rata-rata konsentrasi REY batubara di daerah penelitian sebesar 29,22 ppm, di bawah rata-rata kandungan REY pada *world low-rank coal*. Apabila melihat dari masing-masing individu sampel, terdapat 2 sampel yang melebihi rata-rata *world low-rank coal* yaitu MS02 1C dan L5A 3C dengan konsentrasi REY sebesar 76,75 ppm dan 76,74 ppm. Batubara Formasi Warukin terkayakan dengan dominasi HREY dan LREY yang berasosiasi dengan *terrigenous* dan *infiltrational type*. Proses pengayaan REY dipengaruhi oleh *parting* selama proses pengangkutan yang kemudian mengalami proses *leaching* dan *adsorb* pada material organik.

**Kata kunci :** *Rare Earth Elements and Yttrium* (REY), Batubara Formasi Warukin, proses pengayaan

### ***ABSTRACT***

The utilization of Rare Earth Elements and Yttrium (REY) has significantly increased in high-level material industries and is projected to continue rising for several decades. With the growing demand for REY, alternative sources are needed, and one such source is coal and the ash resulting from coal combustion. The Warukin Formation in the Barito Basin is an interesting coal-bearing formation for in-depth study due to its geological conditions that may enrich coal with REY. This research aims to determine the concentration and mode of occurrence of REY in coal in the research area, as well as the geological processes influencing it. Field data collection was conducted using the ply-by-ply sampling method, followed by sample preparation for geochemical analysis using Inductively Coupled Plasma - Mass Spectrometry-Atomic Emission Spectrometry (ICP-MS/AES), organic petrography, Scanning Electron Microscopy-Energy Dispersive X-Ray Spectroscopy (SEM-EDX), and proximate analysis.

Overall, four lithotype appearances were identified in the coal in the research area: bright, dull, bright-banded, and dull-banded coal. The maseral composition of the coal in the research area consists of vitrinite (58.03% vol.), liptinite (23.56% vol.), inertinite (18.17% vol.), and minerals (0.23% vol.). The coal ash content is relatively high, 1.36% to 15.45% (wt%, adb) with an average value of 4% (wt%, adb). The paleomires in some seams varies from topogenous to ombrogenous mires. The average concentration of REY in coal in the research area is 29.22 ppm, below the average REY content in world low-rank coal. However, two individual samples, MS02 1C and L5A 3C, exceed the average world low-rank coal REY content, with concentrations of 76.75 ppm and 76.74 ppm, respectively. The Warukin Formation coal is enriched with dominant HREY and LREY associated with terrigenous and infiltrational types. The REY enrichment process is influenced by parting during the deposition process, followed by leaching and adsorption onto organic material.

**Keywords :** Rare Earth Elements and Yttrium (REY), Warukin Formation Coal, enrichment process